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R-023-204 .14

**URANYL NITRATE HEXAHYDRATE NEUTRALIZATION PROJECT
(ANALYSES FOR PIPE IN PIPE OPTION)**

02/17/95

DOE-0585-95
DOE-FN EPAS
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LETTER

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Department of Energy
Fernald Environmental Management Project
P. O. Box 398705
Cincinnati, Ohio 45239-8705
(513) 648-3155

FEB 17 1995

DOE-0585-95

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - 5HRE-8J
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Tom Schneider, Project Manager
Ohio Environmental Protection Agency
401 East 5th Street
Dayton, Ohio 45402-2911

Dear Mr. Saric and Mr. Schneider:

URANYL NITRATE HEXAHYDRATE NEUTRALIZATION PROJECT

Enclosed are the analyses for the pipe in a pipe option and the transportation by truck option. It was determined that neither of these options would result in an expedited start-up date. Therefore, we plan to continue with our present plans to neutralize Uranyl Nitrate Hexahydrate (UNH) in accordance with the work plan. The outside contractor option that would solidify UNH is being developed as previously discussed in our weekly meeting.

If you or your staff have any questions, please contact Chris White at (513) 648-3172.

Sincerely,

Johnny Rasing

for

Jack R. Craig
Fernald Remedial Action
Project Manager

FN:White

Enclosures: As Stated

cc w/enc:

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PARSONS

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Fairfield, OH 45014
(513) 870-0300
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February 14, 1995
PARSONS ID#:04:119:223:0026-95

Mr. Robert Heck, Project Manager
Fernald Environmental Restoration
Management Corporation
P.O. Box 538704
Cincinnati, OH 45253-8704

Subject: Report On Secondary Containment For UNH Pipe
UNH Neutralization Project
Project Order 119 (PO-119)
Uranyl Nitrate Neutralization Project
Subcontract No. 2-21487
PARSONS Environmental Remedial Action Project

Dear Mr. Heck:

PARSONS' evaluation of the various means of achieving secondary containment on the neutralized slurry line is attached. The options range in cost from approximately \$190,000 for CPVC primary in CPVC secondary on grade to \$353,000 for installing HDPE secondary containment over the existing carbon steel pipe. Installation times range from 13 weeks (including engineering and procurement) for the CPVC/CPVC system and the prefabricated double contained system on grade to 17.3 weeks for the carbon steel/CPVC system on the pipe racks. Availability of materials does not appear to be a constraint. We contacted vendors who currently supply material to FEMP, and these vendors claimed that, except for the prefabricated system, all materials were available in stock.

Based on cost, schedule, and serviceability, the CPVC primary in CPVC secondary installed on grade appears to be the most attractive option. Options including HDPE pipe are also attractive based on cost and schedule; however, the criterion for 100 psi service at 140 degrees F is at the upper limit of the performance envelope for HDPE pipe. PARSONS

Mr. Robert Heck, Project Manager

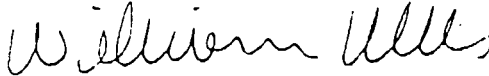
February 14, 1995

Page Two of Two

therefore recommends retaining HDPE for consideration only as secondary containment.

Please contact me at 870-8159 if you have any questions on this matter.

Very truly yours,
PARSONS



William F. Ubbes
Project Manager, UNH

WFU:nw

c: FERMCO: W. Kortier
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PARSONS: Document Control
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*Letter Only

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APPENDIX 1

MINUTES OF JANUARY 28, 1995 MEETING

MEETING MINUTES

Date: January 31, 1995

Page: 1 of 3

PARSONS ID#:04:119:223:0018-95

SUBJECT OF MEETING: Secondary containment of MDU slurry piping

RELATED PROJECT ORDER: 119, UNH

DATE OF MEETING: January 28, 1995

LOCATION: PARSONS' Fairfield Training

ATTENDEES:

Chris White, DOE-FN
Tony Kupinski
Tony Pyrz
Bill Ubbes
Salim Ghantous
Don Rosene
Bob Nemade
Jerry Adams
Dell Young
Prakash Mohanty

Bob Heck, FERMCO
Dave Brettschneider, FERMCO
Don Paine, FERMCO
Stan Frank, FERMCO
Bill Kortier, FERMCO
Brenda Perkins, FERMCO
Tom Crawford, FERMCO
Jim Trujillo, FERMCO
Joel Bradburne, FERMCO

PURPOSE: Discuss various options for secondary containment systems

DISCUSSIONS:

Part I:

Bill Ubbes presented various options for secondary containment of Magnesium Diuranate (MDU) slurry transfer piping from Plant 2/3 to Plant 8. Two categories of options, one consisting of a complete new system and the other, retrofitting the existing piping, were discussed. All options discussed are described in Attachment A. Material cost for PVDF (Kynar) was considered to be too high and therefore was dropped from further investigation. After discussion, it was agreed that four alternatives for primary and two for secondary piping material for new system will be considered for further evaluation based on schedule and cost of procurement and installation. They are as follows:

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Primary:

1. Carbon Steel
2. High Density Poly Ethylene (HDPE)
3. Chlorinated Poly Vinyl Chloride (CPVC)
4. Hose

Secondary

1. High Density Poly Ethylene (HDPE)
2. Chlorinated Poly Vinyl Chloride (CPVC)

It was agreed that the option of running the new system below grade has more disadvantages than advantages. The major disadvantages are: 1) additional permitting; 2) waste stream generation; and 3) possible pocket formation and, thereby, impeding proper drainage. This option was deleted from further consideration.

FERMCO instructed PARSONS to prepare cost estimates for the following:

New Piping system: All systems considering possible combinations of the above mentioned primary/secondary piping material and above grade and on grade routing from Plant 2/3 to Plant 8.

Existing System: Two options of providing secondary containment by retrofitting the existing piping system on the rack.

PARSONS will prepare the above cost estimates for review with FERMCO in a meeting scheduled for January 31, 1995 at the Site at 9.30 A.M.

Part II:

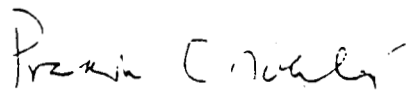
After PARSONS completed its presentation, FERMCO operations group presented several alternatives. They are as follows:

1. Use outside vendor (Chem Nuclear) to neutralize and then solidify for disposal.
2. Use outside vendor (Nuclear Fuel Service) to transport UNH material offsite to process for resale.
3. FERMCO buys or leases the equipment from Chem Nuclear and processes. Equipment cost may be approximately \$500,000.00.

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4. Truck UNH to Plant 2/3 for neutralization. After neutralization, truck MDU slurry to Plant 8. Issues to be considered are: 1) Truck loading/unloading facility; 2) Connections between truck and tank; 3) procedures and training; 4) New ramp at Plant 2/3; and 5) one truck for acid and one truck for slurry.
5. Inspect existing pipelines prior to processing of UNH and prepare for reuse to transfer material. This will involve reinstalling valves, removing asbestos, inspecting and hydrotesting. Cost of Asbestos removal cost may already be included in the base line cost.

FERMCO has not requested any support from PARSONS for Part II at this time.



Prakash Mohanty, Project Engineer

c: Participants
FERMCO Document Control
PARSONS Document Control
Project File

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**ATTACHMENT A
Primary Pipe (3"dia)**

Material	Material Rating - 100 psi @ 140°F	Service - MDU slurry	Installation	Routing	Schedule	Cost
Carbon Steel, Sch. 40	Excellent	Good	Butt weld; Support with spacers inside secondary	On grade or Existing racks with new supports		
Stainless steel, Sch. 40	Excellent	Good	Butt weld; Support with spacers inside secondary	On grade or Existing racks with new supports		
HDPE, SDR 7	Good	Excellent	Fusion weld; Support with spacers inside secondary	On grade/ above grade with new supports		
CPVC, Sch. 80	Good	Excellent	Glue; Support with spacers inside secondary	On grade/ above grade with new supports		
PVDF (Kynar), Sch. 40	Good	Excellent	Fusion; Support with spacers inside secondary	On grade/ above grade with new supports		
Natural Rubber Hose/SBR	Good	Good	100'0" Length			

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Secondary (6" dia)

Material	Material Rating - 10psi @ 140 ° F	Service (MDU slurry)	Installation	Routing	Schedule	Cost
Carbon Steel, Sch. 40	Excellent	Excellent	Butt weld; Support at every 20'-0"; Electric Traced; Insulated; Leak detection	On grade or Existing racks with new supports		
Stainless steel, Sch. 40	excellent	Good	Butt weld; Support at every 20'-0"; Electric Traced; Insulated; Leak detection	On grade or Existing racks with new supports		
HDPE, SDR 7	Fair	Excellent	Fusion weld; Continuous Support; Electric Traced; Insulated; Leak detection	On grade/ above grade with continuous new supports		
CPVC, Sch. 80	Good	Excellent	Glue; Support at every 10'-0"; Electric Traced; Insulated; Leak detection	On grade/ above grade with new supports		
PVDF (Kynar), Sch. 40	Good	Excellent	Fusion weld; Continuous Support; Electric Traced; Insulated; Leak detection	On grade/ above grade with new supports		

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APPENDIX 2

SECONDARY CONTAINMENT SYSTEM EVALUATION

EVALUATION OF SECONDARY CONTAINMENT OPTIONS FOR UNH PIPING

1. INTRODUCTION AND BACKGROUND

The carbon steel neutralized slurry line running from Plant 2/3 to Plant does not have secondary containment. PARSONS was asked by FERMCO to investigate methods for achieving secondary containment on this line. The criterion was to achieve full 360° containment of the part of the line not already in secondary containment. The options considered included replacing the existing pipe with new double-wall pipe, retaining the existing pipe and installing either a liner or a sleeve, in the case of new double-wall pipe, routing the pipe either in the existing racks, on grade, or below grade. Several material options for the primary and secondary piping were considered, and rough order-of-magnitude cost estimates were prepared for the most favorable combinations of materials.

This report presents the results of PARSONS' evaluation.

2. MATERIALS

PARSONS considered the following materials for the primary and secondary pipes:

New double-wall pipe:

Primary (3" pipe): Carbon steel, Sch. 40
Stainless steel, Sch. 40
HDPE, SDR 7
CPVC, Sch. 80
PVDF (Kynar), Sch. 40
Hose

Secondary (6" pipe): Carbon steel, Sch. 40
Stainless steel, Sch. 40
HDPE, SDR 32.5
CPVC, Sch. 40
PVDF (Kynar), Sch. 40
Hose

Retain existing carbon steel pipe:

Install secondary sleeve
over existing pipe: HDPE, SDR 32.5
Hose

Install primary liner
inside existing pipe PVDF, Sch. 40

FERMCO and PARSONS met on January 28, 1995, to evaluate these material options. Please see the minutes of that meeting (Appendix 1) for the evaluation of each option. The participants in that meeting decided, primarily on the basis of cost and ease of installation, to retain the following materials for more detailed evaluation:

Primary: Carbon steel
HDPE
CPVC
Hose (Natural rubber)

Secondary: HDPE
CPVC

Sleeve over existing pipe: HDPE

It was also decided to eliminate the below-grade routing option due to the potential for generation of contaminated soil.

3. EVALUATION

PARSONS then undertook the more detailed evaluation of the surviving options, including cost estimates and qualitative assessment. PARSONS evaluated all combinations of primary and secondary pipe materials and both routing options, along with an additional option of installing prefabricated double-walled pipe. The various combinations were evaluated against the factors of suitability for intended service, installation, cost, and installation schedule. This detailed evaluation is given in Appendix 2.

All secondary containment systems will require some sort of leak detection system between the primary and secondary pipes. The type of leak detection system is independent of the materials selected. All leak detection systems are incompatible with steam tracing; electric tracing must be used to avoid false signals. An evaluation of different leak detection systems is included in Appendix 3. The cost estimates are based on a cable system.

The detailed order-of-magnitude cost estimates are given in Appendix 4. There are 18 estimates: all permutations of primary and secondary materials, except that the hose/CPVC on rack and on grade, and the hose/HDPE on rack combinations were not costed; two estimates for prefabricated double containment systems on rack and on grade; two estimates for single hose systems on rack and on grade, and an estimate for installing a sleeve over the existing carbon steel pipe.

All installation costs and schedules are based on a crew of 5 workers. All costs include engineering/design, project management, and construction management. All costs include a 20% contingency, except for the option of installing a sleeve over the existing pipe, where a 30% contingency was included due to the large uncertainty in the constructability of this method.

4. RESULTS

4.1 Performance

All systems evaluated are acceptable for the required service; however, the criterion for 100 psi service at 140 degrees F is at the upper range of performance for HDPE pipe. This factor could lead away from consideration of HDPE as a primary. There is a concern with degradation of CPVC pipe under long exposure to ultraviolet radiation, which could lead away from the consideration of CPVC as a secondary. This concern can be addressed during detailed design by, for example, insulating the outside of the secondary.

4.2 Schedule

Installation times for the secondary containment systems range from 5 weeks for the CPVC/CPVC system and the prefabricated double contained system on grade to 9.3 weeks for the carbon steel/CPVC system on the pipe racks. The installation time for the hose without secondary containment on grade is 3.5 weeks. Availability of materials does not appear to be a constraint. Vendors who currently supply material to FEMP were contacted, and these vendors claimed that all materials were available in stock, except for the prefabricated secondary containment system. Engineering/design and procurement times are likely to be similar for all options. One month for engineering/design and one month for procurement should be added to the installation times shown in the summary to obtain the complete project schedule.

4.3 Cost

The options range in cost from approximately \$190,000 for CPVC primary in CPVC secondary on grade to \$353,000 for installing HDPE secondary containment over the existing carbon steel pipe. When the latter option is excluded, the next highest cost is \$258,000. This range of \$68,000 is within the accuracy limits of this order-of-magnitude estimate. Therefore, cost is not a strong discriminator between the various options. The cost of installing in racks was in all cases greater than installation on grade.

4.4 Recommendations

Based on cost, schedule, and serviceability, the CPVC primary in CPVC secondary installed on grade appears to be the most attractive option. Options including HDPE pipe are also attractive based on cost and schedule; however, the criterion for 100 psi service at 140 degrees F is at the upper limit of the performance envelope for HDPE pipe. PARSONS therefore recommends retaining HDPE for consideration only as secondary containment.

Retrofitting Existing Pipe for Secondary containment

Material	Material Rating - 10psi @ 140 ° F	Service (MDU slurry)	Installation	Routing	Schedule	Cost
HDPE as sleeve on existing pipe	Excellent	Excellent	Fusion weld; Insulation to be stripped and reinstalled; Steam Trace to be removed; Electric Trace to be installed; Leak detection	Existing racks with existing supports to be modified to provide continuous support		
PVDF as liner	Good	Excellent	Fusion weld; Insulation to be stripped and reinstalled; Steam Trace to be removed; Electric Trace to be installed; Leak detection	Existing racks with existing supports		

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SYSTEM EVALUATION MATRIX

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System Description	Primary Material Rating - 100 psi @ 140°F /Secondary Material rating - 10 psi @ 140°F	Service - MDU slurry (Based on abrasion resistance of material)	Advantages	Disadvantages	Schedule (Including Engineering and Procurement)	Cost
1. Primary: CS, Sch. 40, 3" Secondary: HDPE, SDR 32.5, 6" On grade	Primary: Excellent Secondary: Good	Primary: Good Secondary: Good	Easier to install and access. If sight glass is used for leak detection, easier to monitor.	Continuous support. Pocket in line; draining required. Need ramp at roadways. May require personnel shielding.	14.5 weeks	\$200,800
2. Primary: CS, Sch. 40, 3" Secondary: HDPE, SDR 32.5, 6" Above grade	Primary: Excellent Secondary: Good	Primary: Good Secondary: Good	Line sloped; no pocket. Routed on existing pipe rack.	New continuous support. Difficult for access to inspect leak detection system and repair.	16 weeks	\$243,700
3. Primary: CS, Sch. 40, 3" Secondary: CPVC, Sch. 40, 6" On grade	Primary: Excellent Secondary: Good	Primary: Good Secondary: Good	Easier to install and access. If sight glass is used for leak detection, easier to monitor.	New support required every 5'-0". Pocket in line; draining required. Need ramp at roadways. May require personnel shielding. Possible UV degradation of CPVC.	14.5 weeks	\$213,600
4. Primary: CS, Sch. 40, 3" Secondary: CPVC, Sch. 40, 6" Above grade	Primary: Excellent Secondary: Good	Primary: Good Secondary: Good	Line sloped; no pocket. Routed on existing pipe rack.	New support required for pipe every 5'-0". Difficult for access to inspect leak detection system and repair. Possible UV degradation of CPVC.	17.3 weeks	\$258,300

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SYSTEM EVALUATION MATRIX

Page 2 of 5

System Description	Primary Material Rating - 100 psi @ 140°F /Secondary Material rating - 10 psi @ 140°F	Service - MDU slurry (Based on abrasion resistance of material)	Advantages	Disadvantages	Schedule (Including Engineering and Procurement)	Cost
5. Primary: HDPE, SDR 7, 3" Secondary: HDPE, SDR 32.5, 6" On grade	Primary: Good Secondary: Good	Primary: Excellent Secondary: Good	Easier to install and access. If sight glass is used for leak detection, easier to monitor.	Continuous support. Pocket in line; draining required. Need ramp at roadways. May require personnel shielding.	14.5 weeks	\$199,600
6. Primary: HDPE, SDR 7, 3" Secondary: HDPE, SDR 32.5, 6" Above grade	Primary: Good Secondary: Good	Primary: Excellent Secondary: Good	Line sloped; no pocket. Routed on existing pipe rack.	New continuous support. Difficult for access to inspect leak detection system and repair.	16 weeks	\$234,800
7. Primary: HDPE, SDR 7, 3" Secondary: CPVC, Sch. 40, 6" On grade	Primary: Good Secondary: Good	Primary: Excellent Secondary: Good	Easier to install and access. If sight glass is used for leak detection, easier to monitor.	New support required for pipe every 5'-0". Pocket in line; draining required. Need ramp at roadways. May require personnel shielding. Possible UV degradation of CPVC.	14.5 weeks	\$212,000
8. Primary: HDPE, SDR 7, 3" Secondary: CPVC, Sch. 40, 6" Above grade	Primary: Good Secondary: Good	Primary: Excellent Secondary: Good	Line sloped; no pocket; Routed on existing pipe rack.	New support required for pipe every 5'-0". Difficult for access to inspect leak detection system and repair. Possible UV degradation of CPVC.	16 weeks	\$258,500
9. Primary: CPVC, Sch. 80, 3" Secondary: HDPE, SDR 32.5, 6" On grade	Primary: Good Secondary: Good	Primary: Excellent Secondary: Good	Easier to install and access. If sight glass is used for leak detection, easier to monitor.	Continuous support. Pocket in line; draining required. Need ramp at roadways. May require personnel shielding.	14.3 weeks	\$197,800

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SYSTEM EVALUATION MATRIX

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System Description	Primary Material Rating - 100 psi @ 140°F /Secondary Material rating - 10 psi @ 140°F	Service - MDU slurry (Based on abrasion resistance of material)	Advantages	Disadvantages	Schedule (Including Engineering and Procurement)	Cost
10. Primary: CPVC, Sch. 80, 3" Secondary: HDPE, SDR 32.5, 6" Above grade	Primary: Good Secondary: Good	Primary: Excellent Secondary: Good	Line sloped, no pocket. Routed on existing pipe rack.	New continuous support. Difficult for access to inspect leak detection system and repair.	16 weeks	\$235,700
11. Primary: CPVC, Sch. 80, 3" Secondary: CPVC, Sch. 40, 6" On grade	Primary: Good Secondary: Good	Primary: Excellent Secondary: Good	Easier to install and access. If sight glass is used for leak detection, easier to monitor.	New support required for pipe every 5'-0". Pocket in line; draining required. Need ramp at roadways. May require personnel shielding. Possible UV degradation of CPVC.	13 weeks	189,400
12. Primary: CPVC, Sch. 80, 3" Secondary: CPVC, Sch. 40, 6" Above grade	Primary: Good Secondary: Good	Primary: Excellent Secondary: Good	Line sloped; no pocket. Routed on existing pipe rack.	New support required for pipe every 5'-0". Difficult for access to inspect leak detection system and repair. Possible UV degradation of CPVC.	16 weeks	\$245,900
13. Primary: Natural rubber/SBR hose, 3" Secondary: HDPE, SDR 32.5, 6" On grade	Primary: Good Secondary: Good	Primary: Good Secondary: Good	Easier to install and access. If sight glass is used for leak detection, easier to monitor.	Continuous support. Pocket in line; draining required. Need ramp at roadways. May require personnel shielding.	13.25 weeks	\$221,000
14. Primary: Natural rubber/SBR hose, 3" Secondary: HDPE, SDR 32.5, 6" Above grade	Primary: Good Secondary: Good	Primary: Good Secondary: Good	Line sloped; no pocket. Routed on existing pipe rack.	New continuous support. Difficult for access to inspect leak detection system and repair.	Not est.	Not est.

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SYSTEM EVALUATION MATRIX

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System Description	Primary Material Rating - 100 psi @ 140°F /Secondary Material rating - 10 psi @ 140°F	Service - MDU slurry (Based on abrasion resistance of material)	Advantages	Disadvantages	Schedule (Including Engineering and Procurement)	Cost
15. Primary: Natural rubber/SBR hose, 3" On grade	Primary: Good Secondary: N/A	Primary: Good Secondary: N/A	Very fast installation. Easier to install and access.	Continuous support. Pocket in line; draining required. Need ramp at roadways. May require personnel shielding. Use support as drip pan for secondary.	11.6 weeks	\$181,364
16. Primary: Natural rubber/SBR hose, 3" Above grade	Primary: Good Secondary: N/A	Primary: Good Secondary: N/A	Very fast installation. Line sloped; no pocket. Routed on existing pipe rack.	Continuous support. Difficult for access to inspect leak detection system and repair. Use support as drip pan.	11 weeks	\$188,400
17. HDPE as secondary on the existing carbon steel pipe	Primary: Excellent Secondary: Good	Primary: Good Secondary: Good	Use the existing piping system	Insulation must be stripped and reinstalled. Steam tracing must be removed; electric tracing to be installed. Continuous support required. Difficult for access to inspect leak detection and repair. Extremely labor intensive. Integrity of longitudinal seam questionable.	16.5 weeks	\$353,500

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SYSTEM EVALUATION MATRIX
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SYSTEMS COSTED BUT NOT EVALUATED

System Description	Schedule	Cost
18. Prefab system on grade	13 weeks	\$249,800
19. Prefab system above grade	12.5 weeks	\$254,300

NOTES:

1. Costs include cable leak detection system
2. Electric heat tracing (rather than steam tracing) required for all alternatives due to leak detection.
3. Costs include engineering.
4. Costs and installation times based on 5-man crew except for No. 17 which is based on 6-man crew.
5. Schedule includes installation only; add approximately one month each for engineering and procurement.
6. Vendors claim all materials available in stock except for prefabricated system (Nos. 18 and 19).

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APPENDIX 3
LEAK DETECTION SYSTEMS

Leak Detection for Double Wall Piping

A. Leak Detection Systems:

1. Cable
2. Pressure Switches
3. Pressure Indicator
4. Moisture Sensor
5. Mass or Flow Balance
6. Visual
7. Level Switches
 - a. Conductance
 - b. Fiber Optic
 - c. Float Switch
8. Combination

B. Systems excluded from further discussion and why:

1. Moisture sensors provide less information than pressure switches but are more expensive.
2. Mass or Flow Balancing will not detect small leaks and is the most expensive method except when used for very long piping runs
3. Float switches do not work well with slurries.

C. Typical characteristics of remaining systems:

1. Steam Heat Tracing: Steam heat tracing on the inside of the secondary containment piping will cause continuous problems. The Steam trace will leak a little bit, causing condensate to set off most of the leak detectors and pressure increase to trigger the pressure switches. All systems should be used with electric tracing only.
2. Secondary containment piping will need a method of connecting an air supply to pressurize or fill secondary containment piping with clean dry air or inert gas. The clean dry air or inert gas will prevent false alarms from condensate.

D. Systems for discussion:

1. Pressure switch: The secondary containment piping can be pressurized to an intermediate level between the operating level of the primary pipe and atmospheric (say 5 psi). Two pressure switches (High and Low) would allow monitoring of the integrity of the primary and secondary containment piping. An increase in the pressure of the secondary containment piping would indicate

a leak in the primary piping. A decrease in pressure would, under normal operating conditions, indicate failure of the secondary containment piping. A decrease in the pressure could also indicate a leak in the primary piping if it is not pressurized

2. Pressure Indicator: Will operate on the same principles as pressure switches also allowing easy verification of integrity of secondary containment piping.
3. Conductance or Fiber Optic Level Switches: (equivalent cost and information) The Level switches are installed in drip legs. The drip leg is used to collect the liquid to reduce the amount of liquid required to detect a leak. Spacing is approximately every 50 to 100 feet and at every low point in the system. This distance is considered a balance between cost and the amount of information obtained. The closer they are the less the amount of pipe that will need to be taken apart to find and fix the leak. This type is very economical on small piping systems. The cost increases roughly proportional to the length pipe (i.e. 1 sensor and 1 drip leg every 50 to 100 feet of pipe).
4. Visual: Visual Leak Detection Consists of sight glasses which requires a person to walk down the pipe on a periodic basis. Piping on elevated pipe racks will be difficult to visually inspect. This method can be used for piping laid directly on or near the ground if sections of the secondary containment pipe are made clear.
5. Cable Leak Detection: Cable systems are considered to provide the most information. They are capable of indicating the location of a leak within plus or minus 2 feet. Compared to level switches which could be as far away as 100 feet, this accuracy allows the maintenance effort of the pipe to be minimized. This information could make repairs much cheaper if they are ever needed. The installed cost of a system for 300 feet of piping would be roughly equivalent to the cost of Conductance or Fiber Optics level switches if the cost of the additional drip legs is considered.
6. Combination Leak Detection Systems: Combinations of the above systems are sometimes used to compliment or verify the operation of each other.

E. Piping placed on ground or sleepers:

1. Assuming there is not enough clearance under the pipe for drip legs to be positioned under the piping every 50 to 100 feet, level switches are not recommended, due to the increased volume of liquid needed to trigger the switches.

F. Piping on Pipe Supports:

1. Visual method should not be used alone if pipe is not easily accessible for close inspection, leaving pressure switches, level switches and cable as primary detectors for this situation.

APPENDIX 4
COST ESTIMATES

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#1

CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P.O. # :
BY:
DATE:
FILE #

999
EST. DE
31-Jan-99
OGCSHD

9206

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On Grade, 3' Cstl. Sch.40 / 6" HDPE SDR 32.5 Pipe												
	<u>DIRECT COST</u>												
1	Install Pipe 3' Cstl In 6" HDPE	1	LOT		529					10,962	10,400	17,237	38,599
	<u>INDIRECT COST</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		79					1,644		1,034	1,644
2	Small Tools/Consumables	1	LOT								11,967		1,034
3	Contractor's Equipment Rentals	1	LOT		178					1,505		811	11,967
4	Temporary Facilities	1	LOT		112								2,316
5	Job Condition Factors (Weather, Height, Congestion)	1	LOT		116								2,403
5	Contractor Safety	1	LOT		56					753		405	1,158
6	Job Clean Up	1	LOT		86								1,774
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			12,188	415		12,188	12,602
7	4 Changes/day for 5 men for 6.50 wks. Exams.4hrs/ea.												
7	CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			15,000	8,089		15,000	23,089
	Medical Exams Entry,Exit For 5 Men + 4 Hrs. Ea.									5,700			5,700
8	Payroll Burdens & Benefits @ 52%	1	LOT										25,572
9	Overhead & Profit @ 25%	1	LOT										1,301
10	Bond @ 1%	1	LOT										3,500
11	Rad. Tech. Delays	1	LOT		100	35				3,500			2,800
12	Sales Tax on materials @ 6 %	1	LOT										
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												10,837
2	Construction Management (4%)												5,852
	<u>ENGINEERING COST</u>												15,215
1	A/E Subcontract Fee (10%)												33,473
	<u>CONTINGENCY (20%)</u>												
	<u>TOTAL</u>				1,665					\$32,568	\$22,367	\$46,675	\$200,837

Summary

CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P.O.# : 999
BY: EST. DEPT.
DATE: 31-Jan-95
FILE # OGCSHOPE

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On Grade, 3' Cstl. Sch.40 / 6' HDPE SDR 32.5 Pipe												
1	Primary 3' Carbon Steel (Sch.40) Pipe	520	LF	0.22	114	20.74	4.55		3.60	2,364		1,872	4,236
2	Secondary 6' HDPE Pipe (SDR 32.5)	520	LF	0.33	172	20.74	6.86		1.80	3,567		936	4,503
3	Elbows, Cstl.	1	LS	30.00	30	20.74	622.20		70.00	622		550	1,172
4	Elbows, HDPE	1	LS	32.00	32	20.74	663.68		1000.00	664		1,000	1,664
5	Spacers	1	LS	14.00	14	20.74	290.36		520.00	290		520	810
6	Pipe Supports (Allowance For Pipe Tie Downs)	1	LS	16.00	60	20.74	1235.07		600.00	1,235		600	1,835
7	Pipe Tie-ins	2	EA	6.00	12	20.74	124.44		100.00	249		200	449
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	20.00	20	20.74	414.80		100.00	415		100	515
10	Fiberglass 2" Hk. Alum. Jacket	520	LF					20			10,400		10,400
11	Electric Heat Tracing	520	LF	0.03	16	20.74	0.64		5.21	332		2,709	3,041
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6550.00	332		6,550	6,882
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187		300	487
15	Truck Ramp	1	LS	20.00	20	20.74	414.80		1700.00	415		1,700	2,115
	SUB-TOTAL DIRECT COST				529					\$10,962	\$10,400	\$17,237	\$38,599
	Construction Equipment Rental (Assume 6.50 Wks. Equip. Rentals)												
1	Hydraulic Crane (1 Week Only)	1	EA.					750			750		750
2	Scissor Lift (Not required)	1	EA.										
3	Fork Lift	1	EA.					225			1,463		1,463
4	Pick Up Truck	1	EA.					125			813		813
5	Fusion Weld Machine (With Operator)	1	EA.	260.00	260	20.74	5392.40			5,392	1,750		7,142
6	Fuel	1	LS					1,000			1,000		1,000
7	Mob. & Demob.	1	LS					800			800		800
	SUB-TOTAL (Equip. Rentals)				21,834								\$11,967

Details

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
BY: EST. DEPT.
DATE: 31-Jan-95
FILE # ORCSDHPE

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On Pipe Rack, 3" Cstl. Sch.40 / 6" HDPE Pipe												
	<u>DIRECT COST</u>												
1	Install 3" Cstl In 6" HDPE Pipe	1	LOT		753					15,612	12,202	15,843	43,656
	<u>INDIRECT COST</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		113					2,342			2,342
2	Small Tools/Consumables	1	LOT									951	951
3	Contractor's Equipment Rentals	1	LOT		178						22,337		22,337
4	Temporary Facilities	1	LOT		126					1,703		917	2,619
5	Job Condition Factors (Weather, Height, Congestion)	1	LOT		146								3,035
5	Contractor Safety	1	LOT		63					851		458	1,310
6	Job Clean Up	1	LOT		110								2,287
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			15,000	415		15,000	15,415
	4 Changes/day for 5 men for 8 wks. Exams. 4hrs/ea.												
7	CEHCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			15,000	8,089		15,000	23,089
	Medical Exams Entry, Exit For 5 Men + 4 Hrs. Ea.												
8	Payroll Burdens & Benefits @ 52%	1	LOT							8,118			8,118
9	Overhead & Profit @ 25%	1	LOT										31,290
10	Bond @ 1%	1	LOT										1,530
11	Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT										2,890
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												13,149
2	Construction Management (4%)												7,101
	<u>ENGINEERING COST</u>												
1	A/E Subcontract Fee (10%)												18,462
	<u>CONTINGENCY (20%)</u>												40,616
	<u>TOTAL</u>				2,000					\$40,629	\$34,538	\$48,169	\$243,696

Summary

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
BY: EST. DEPT.
DATE: 31-Jan-95
FILE # ORCSDPE

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On Pipe Rack, 3' Cstl. Sch.40 / 6" HDPE Pipe												
1	Primary 3' Cstl. Sch.40 Pipe	480	LF	0.56	269	20.74	11.62		3.60	5,579		1,728	7,307
2	Secondary 6" HDPE SDR 32.5 Pipe	480	LF	0.33	158	20.74	6.83		1.80	3,277		864	4,141
3	Elbows, 3' Cstl.	1	LS	51.00	51	20.74	1057.74		450.00	1,058		550	1,608
4	Elbows, 6" HDPE	1	LS	60.00	60	20.74	1244.40		1750.00	1,244		1,750	2,994
5	Spacers	1	LS	12.00	12	20.74	248.88		500.00	249		500	749
6	Pipe Supports	1	LS	68.00	88	20.74	1819.94		1100.00	1,820		1,100	2,920
7	Pipe Tie-ins	2	EA	6.00	12	20.74	124.44		100.00	249		200	449
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	50.00	50	20.74	1037.00		150.00	1,037		150	1,187
10	Fiberglass 2" thk. Alum. Jacket	480	LF					25			12,202		12,202
11	Electric Heat Tracing	480	LF	0.03	14	20.74	0.60		5.21	290		2,501	2,791
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6300.00	332		6,300	6,632
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187			187
	SUB-TOTAL DIRECT COST				753					\$15,612	\$12,202	\$15,843	\$43,656
	Construction Equipment Rental (Assume 8 Wks. Equip. Rentals)												
1	Hydraulic Crane	1	EA.					750			6,000		6,000
2	Scissor Lift	1	EA.					375			3,000		3,000
3	Fork Lift	1	EA.					225			1,800		1,800
4	Pick Up Truck	1	EA.					125			1,000		1,000
5	Fusion Weld Machine (With Operator)	1	EA.	320.00	320	20.74	6636.80			6,637	1,900		8,537
6	Fuel	1	LS					1,100			1,100		1,100
7	Mob. & Demob.	1	LS					900			900		900
	SUB-TOTAL (Equip. Rentals)				22,308								\$22,337

Details

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

#3

COST ESTIMATE DETAILS

P. O. # :
BY:
DATE:
FILE #

999
EST. DEPT.
31-Jan-95
OGCSCPVC

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On Grade, 3' Carbon Steel & 6' CPVC Sch.40 Pipe												
	<u>DIRECT COST</u>												
1	Install Pipe 3' Caron Steel In 6' CPVC	1	LOT		499					10,342	10,400	24,147	44,889
	<u>INDIRECT COST</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		75					1,551			1,551
2	Small Tools/Consumables	1	LOT									1,449	1,449
3	Contractor's Equipment Rentals	1	LOT		178						11,394		11,394
4	Temporary Facilities	1	LOT		130					1,751		943	2,693
5	Job/Condition Factors (Weather,Height, Congestion)	1	LOT		116								2,409
5	Contractor Safety	1	LOT		65					875		471	1,347
6	Job/Clean Up	1	LOT		95								1,972
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			12,188	415		12,188	12,602
7	4 Changes/day for 5 men for 6.5 wks. Exams.4hrs/ea												
7	CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			15,000	8,089		15,000	23,089
	Medical Exams Entry,Exit For 5 Men + 4 Hrs. Ea.												
8	Payroll Burdens & Benefits @ 52%	1	LOT							5,378			5,378
9	Overhead & Profit @ 25%	1	LOT										27,193
10	Bond @ 1%	1	LOT										1,366
11	Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT										3,252
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												11,527
2	Construction Management (4%)												6,224
	<u>ENGINEERING COST</u>												
1	A/E Subcontract Fee (10%)												16,183
	<u>CONTINGENCY (20%)</u>												35,604
	<u>TOTAL</u>				1,667					\$31,901	\$21,794	\$54,198	\$213,622

Summary

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CONTR.NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. #: 999
 BY: EST. DEPT.
 DATE: 31-Jan-95
 FILE # OGCSCPVC

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>On Grade, 3' Carbon Steel & 6" CPVC Sch.40 Pipe</u>												
1	Primary 3' Carbon Steel SCedule 40 Pipe	520	LF	0.22	113	20.74	4.51		3.60	2,344		1,872	4,216
2	Socondary 6' CPVC Pipe (Schedule 40)	520	LF	0.23	121	20.74	4.83		15.30	2,510		7,956	10,466
3	Elbows, 3' Cabon Steel	1	LS	30.00	30	20.74	622.20		200.00	622		550	1,172
4	Elbows 6" CPVC & Couplings	1	LS	58.00	58	20.74	1202.92		990.00	1,203		990	2,193
5	Spacers	1	LS	14.00	14	20.74	290.36		520.00	290		520	810
6	Pipe Supports (Allowance For Pipe Tie Downs)	1	LS	16.00	56	20.74	1154.18		600.00	1,154		600	1,754
7	Pipe Tie-Ins	2	EA	6.00	12	20.74	124.44		100.00	249		200	449
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	20.00	20	20.74	414.80		100.00	415		100	515
10	Fiberglass 2" thk. Alum. Jacket	520	LF			20.74		20			10,400		10,400
11	Electric Heat Tracing	520	LF	0.03	16	20.74	0.64		5.21	332		2,709	3,041
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6550.00	332		6,550	6,882
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187			187
15	Solvent	1	LS						200.00			200	200
16	Truck Ramps	1	LS	20.00	20	20.74	414.80		1700.00	415		1,700	2,115
	SUB-TOTAL DIRECT COST				499					\$10,342	\$10,400	\$24,147	\$44,889
	Construction Equipment Rental (Assume 6.5 Wks. Equip. Rentals)												
1	Hydraulic Crane (1 Week Only)	1	EA.					750			750		750
2	Scissor Lift (Not required)	1	EA.										
3	Fork Lift	1	EA.					225			1,463		1,463
4	Pick Up Truck	1	EA.					125			813		813
5	Fuslon Weld Machine (With Operator)	1	EA.	264.00	264	20.74	5475.36			5,475	1,100		6,575
6	Fuel	1	LS					894			894		894
7	Mob. & Demob.	1	LS					900			900		900
	SUB-TOTAL (Equip. Rentals)												\$11,394

Details

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

#4

COST ESTIMATE DETAILS

P. O. # :
BY:
DATE:
FILE #

999
EST. DEPT.
31 - Jan - 95
ORCSCPVC

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On The Pipe Rack, 3" CSil. Sch.40 / 6" CPVC Sch.40												
	<u>DIRECT COST</u>												
1	Install New Pipe 3" C.S. In 6" CPVC	1	LOT		913					18,927	12,200	22,373	53,500
	<u>INDIRECT COST</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		137					2,839			2,839
2	Small Tools/Consumables	1	LOT									1,342	1,342
3	Contractor's Equipment Rentals	1	LOT								15,478		15,478
4	Temporary Facilities	1	LOT		155					2,087		1,124	3,210
5	Job Condition Factors (Weather, Height, Congestion)	1	LOT		311								6,442
5	Contractor Safety	1	LOT		77					1,043		562	1,605
6	Job Clean Up	1	LOT		122								2,532
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			17,438	415		17,438	17,852
	4 Changes/day for 5 men for 9.3 wks.												
7	CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			10,000	8,089		10,000	18,089
	Medical Exams Entry, Exit For 5 Men + 4 Hrs. Ea.												
8	Payroll Burdens & Benefits @ 52%	1	LOT							9,842			9,842
9	Overhead & Profit @ 25%	1	LOT										33,183
10	Bond @ 1%	1	LOT										1,605
11	Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT										3,170
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												13,935
2	Construction Management (4%)												7,525
	<u>ENGINEERING COST</u>												
1	A/E Subcontract Fee (10%)												19,565
	<u>CONTINGENCY (20%)</u>												43,043
	<u>TOTAL</u>				2,224					\$46,742	\$27,678	\$52,838	\$258,258

Summary

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CONTR.NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
 BY: EST. DEPT.
 DATE: 31-Jan-95
 FILE # ORCSCPVC

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On The Pipe Rack, 3" CSII. Sch.40 / 6" CPVC Sch.40												
1	Primary 3" Carbon Steel (Schedule 40) Pipe	480	LF	0.56	269	20.74	11.62		3.60	5,579		1,728	7,307
2	Secondary 6" CPVC Pipe (Schedule 40)	480	LF	0.60	288	20.74	12.44		15.30	5,973		7,344	13,317
3	Elbows 3" C.S.	1	LS	51.00	51	20.74	1057.74		450.00	1,058		450	1,508
4	Elbows & Couplings 6" CPVC	1	LS	69.00	69	20.74	1431.06		1700.00	1,431		1,700	3,131
5	Spacers	1	LS	12.00	12	20.74	248.88		500.00	249		500	749
6	Pipe Supports	1	LS	68.00	109	20.74	2252.36		1100.00	2,252		1,100	3,352
7	Pipe Tie-ins	2	EA	6.00	12	20.74	124.44		100.00	249		200	449
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	50.00	50	20.74	1037.00		150.00	1,037		150	1,187
10	Fiberglass 2" thk. Alum. Jacket	480	LF								12,200		12,200
11	Electric Heat Tracing	480	LF	0.03	14	20.74	0.60		5.21	290		2,501	2,791
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6300.00	332		6,300	6,632
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187			187
15	Solvent	1	LS						200.00			200	200
	SUB-TOTAL DIRECT COST				913					\$18,927	\$12,200	\$22,373	\$53,500
	Contractor's Rental Equipment (Assume 9.3 Wks. Equip. Rentals)												
1	Hydraulic Crane (Above Grade Only)	1	EA.								6,975		6,975
2	Scissor Lift (Above Grade Only)	1	EA.								3,488		3,488
3	Fork Lift	1	EA.								2,093		2,093
4	Pick Up Truck	1	EA.								1,163		1,163
5	Fusion Weld Machine for HDPE Pipe (Not Required)												
6	Fuel	1	LS								960		960
7	Mob. & Demob.	1	LS								800		800
	SUB-TOTAL (Equip. Rentals)												\$15,478

Details

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # :
BY:
DATE:
FILE #

999
EST. DEPT.
31-Jan-95
OGHDHOPE

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On Grade, 3" HDPE SDR 7 / 6" HDPE SDR 32.5												
	<u>DIRECT COST</u>												
1	Install 3" HDPE Pipe In 6" HDPE	1	LOT		540					11,201	10,400	16,675	38,276
	<u>INDIRECT COST</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		81					1,680			1,680
2	Small Tools/Consumables	1	LOT									1,001	1,001
3	Contractor's Equipment Rentals	1	LOT		178						11,552		11,552
4	Temporary Facilities	1	LOT		111					1,493		804	2,297
5	Job Condition Factors (Weather, Height, Congestion)	1	LOT		117								2,426
5	Contractor Safety	1	LOT		55					746		402	1,148
6	Job Clean Up	1	LOT		84								1,751
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			12,188	415		12,188	12,602
	4 Changes/day for 5 men for 6.5 wks. Exams. 4hrs/ea												
7	CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			15,000	8,089		15,000	23,089
	Medical Exams Entry, Exit For 5 Men + 4 Hrs. Ea.												
8	Payroll Burdens & Benefits @ 52%	1	LOT							5,824			5,824
9	Overhead & Profit @ 25%	1	LOT										25,411
10	Bond @ 1%	1	LOT										1,294
11	Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT										2,764
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												10,769
2	Construction Management (4%)												5,815
	<u>ENGINEERING COST</u>												
1	A/E Subcontract Fee (10%)												15,120
	<u>CONTINGENCY (20%)</u>												33,264
	<u>TOTAL</u>				1,677					\$32,948	\$21,952	\$46,069	\$199,585

Summary

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
BY: EST. DEPT.
DATE: 31-Jan-95
FILE # OGIDHDPE

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On Grade, 3' HDPE SDR 7 / 6' HDPE SDR 32.5												
1	Primary 3' HDPE SDR 7 Pipe	520	LF	0.22	113	20.74	4.51		2.50	2,344		1,300	3,644
2	Secondary 6' HDPE Pipe SDR 32.5	520	LF	0.33	172	20.74	6.86		1.80	3,567		936	4,503
3	Elbows, & Transition Pieces, 3' HDPE	1	LS	30.00	30	20.74	622.20		550.00	622		550	1,172
4	Elbows, 6' HDPE	1	LS	43.00	43	20.74	891.82		1010.00	892		1,010	1,902
5	Spacers	1	LS	14.00	14	20.74	290.36		520.00	290		520	810
6	Pipe Supports (Allowance For Pipe Tie Downs)	1	LS	16.00	61	20.74	1266.18		600.00	1,266		600	1,866
7	Pipe Tie-ins	2	EA	6.00	12	20.74	124.44		100.00	249		200	449
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	20.00	20	20.74	414.80		100.00	415		100	515
10	Fiberglass 2" thk. Alum. Jacket	520	LF					20			10,400		10,400
11	Electric Heat Tracing	520	LF	0.03	16	20.74	0.64		5.21	332		2,709	3,041
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6550.00	332		6,550	6,882
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187		300	487
15	Truck Ramps	1	LS	20.00	20	20.74	414.80		1700.00	415		1,700	2,115
	SUB-TOTAL DIRECT COST				540					\$11,201	\$10,400	\$16,675	\$38,276
	Construction Equipment Rental (Assume 6.5 Wks. Equip. Rentals)												
1	Hydraulic Crane (1 Week Only)	1	EA.					750			750		750
2	Scissor Lift (Not required)	1	EA.										
3	Fork Lift	1	EA.					225			1,460		1,460
4	Pick Up Truck	1	EA.					125			800		800
5	Fusion Weld Machine (With Operator)	1	EA.	260.00	260	20.74	5392.40			5,392	1,550		6,942
6	Fuel	1	LS					900			900		900
7	Mob. & Demob.	1	LS					700			700		700
	SUB-TOTAL (Equip. Rentals)				13,732								\$11,552

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CONTR.NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # :
 BY:
 DATE:
 FILE #

999
 EST. DEPT:
 31-Jan-95
 OR HDPE

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On The Pipe Rack, 3" HDPE & 6" HDPE												
	<u>DIRECT COST</u>												
1	Install New Double Wall Pipe 3" HDPE In 6" HDPE	1	LOT		555					11,510	12,200	15,575	39,284
	<u>INDIRECT COST</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		83					1,726			1,726
2	Small Tools/Consumables	1	LOT									934	934
3	Contractor's Equipment Rentals	1	LOT		320						22,337		22,337
4	Temporary Facilities	1	LOT		114					1,532		825	2,357
5	Job Condition Factors (Weather, Height, Congestions)	1	LOT		285								5,903
5	Contractor Safety	1	LOT		57					766		412	1,179
6	Job Clean Up	1	LOT		107								2,212
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			15,000	415		15,000	15,415
7	4 Changes/day for 5 men for 8.0 wks.												
7	CERCLA Site Access Training	1	LOT		390	20.74			15,000	8,089		15,000	23,089
	Medical Exams. Entry, Exit For 5 Men + 4 Hrs. Ea.												
8	Payroll Burdens & Benefits @ 52%	1	LOT							5,985			5,985
9	Overhead & Profit @ 25%	1	LOT										30,105
10	Bond @ 1%	1	LOT										1,482
11	Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT										2,865
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												12,670
2	Construction Management (4%)												6,842
	<u>ENGINEERING COST</u>												
1	A/E Subcontract Fee (10%)												17,788
	CONTINGENCY (20%)												39,135
	<u>TOTAL</u>				2,030					\$33,523	\$34,537	\$47,747	\$234,807

Summary

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CONTR.NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
 BY: EST. DEPT.
 DATE: 31-Jan-95
 FILE # ORHODHPE

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On The Pipe Rack, 3' HDPE & 6' HDPE												
1	Primary 3' HDPE SDR 7 Pipe	480	LF	0.22	106	20.74	4.58		2.50	2,198		1,200	3,398
2	Secondary 6' HDPS SDR 32.5 Pipe	480	LF	0.33	158	20.74	6.83		1.80	3,277		864	4,141
3	Elbows 3' HDPE	1	LS	44.00	44	20.74	912.56		810.00	913		810	1,723
4	Elbows 6' HDPE	1	LS	60.00	60	20.74	1244.40		1750.00	1,244		1,750	2,994
5	Spacers	1	LS	12.00	12	20.74	248.88		500.00	249		500	749
6	Pipe Supports	1	LS	68.00	62	20.74	1284.84		1100.00	1,285		1,100	2,385
7	Pipe Tie-ins	2	EA	5.00	10	20.74	103.70		100.00	207		200	407
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	50.00	50	20.74	1037.00		150.00	1,037		150	1,187
10	Fiberglass 2" thk. Alum. Jacket	480	LF								12,200		12,200
11	Electric Heat Tracing	480	LF	0.03	14	20.74	0.60		5.21	290		2,501	2,791
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6300.00	332		6,300	6,632
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187			187
	SUB-TOTAL DIRECT COST				555					\$11,510	\$12,200	\$15,575	\$39,284
	Contractor's Rental Equipment (Assume 8.0 Wks. Equip. Rentals)												
1	Hydraulic Crane	1	EA								6,000		6,000
2	Scissor Lift	1	EA								3,000		3,000
3	Fork Lift	1	EA								1,800		1,800
4	Pick Up Truck	1	EA								1,000		1,000
5	Fusion Weld Machine for HDPE Pipe	1	LS	320	320	20.74		1,900		6,637	1,900		8,537
6	Fuel	1	LS					1,100			1,100		1,100
7	Mob. & Demob.	1	LS					900			900		900
	SUB-TOTAL (Equip. Rentals)												\$22,337

Details

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P.O.#:
BY:
DATE:
FILE #

999
EST. DEPT.
31-Jan-95
OGHDCPVC

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On Grade, 3" HDPE SDR 7 / 6" CPVC Sch. 40 Pipe												
	<u>DIRECT COST</u>												
1	Install Pipe 3" HDPE In 6" CPVC	1	LOT		499					10,342	10,400	23,575	44,317
	<u>INDIRECT COST</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		75					1,551			1,551
2	Small Tools/Consumables	1	LOT									1,415	1,415
3	Contractor's Equipment Rentals	1	LOT		178						11,242		11,242
4	Temporary Facilities	1	LOT		128					1,728		931	2,659
5	Job Condition Factors (Weather, Height, Congestion)	1	LOT		116								2,401
5	Contractor Safety	1	LOT		64					864		465	1,330
6	Job Clean Up	1	LOT		94								1,947
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			12,188	415		12,188	12,602
	4 Changes/day for 5 men for 6.5 wks. Exams. 4hrs/ea.												
7	CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			15,000	8,089		15,000	23,089
	Medical Exams Entry, Exit For 5 Men + 4 Hrs. Ea.												
8	Payroll Burdens & Benefits @ 52%	1	LOT							5,378			5,378
9	Overhead & Profit @ 25%	1	LOT										26,983
10	Bond @ 1%	1	LOT										1,357
11	Rad Tech. Delays	1	LOT		100	35				3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT										3,214
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												11,439
2	Construction Management (4%)												6,177
	<u>ENGINEERING COST</u>												
1	A/E Subcontract Fee (10%)												16,060
	<u>CONTINGENCY (20%)</u>												35,332
	<u>TOTAL</u>				1,663					\$31,867	\$21,642	\$53,573	\$211,993

Summary

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
BY: EST. DEPT.
DATE: 31-Jan-95
FILE # OGHDCPVC

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>On Grade, 3" HDPE SDR 7 / 6" CPVC Sch.40 Pipe</u>												
1	Primary 3" HDPE SDR 7 Pipe	520	LF	0.22	113	20.74	4.51		2.50	2,344		1,300	3,644
2	Secondary 6" CPVC Pipe (Schedule 40)	520	LF	0.23	121	20.74	4.83		15.30	2,510		7,956	10,466
3	Elbows, Couplings & Transition Pieces, 3" HDPE	1	LS	30.00	30	20.74	622.20		450.00	622		550	1,172
4	Elbows & Couplings 6" CPVC	1	LS	58.00	58	20.74	1202.92		990.00	1,203		990	2,193
5	Spacers	1	LS	14.00	14	20.74	290.36		520.00	290		520	810
6	Pipe Supports (Allowance For Pipe Tie Downs)	1	LS	16.00	56	20.74	1154.18		600.00	1,154		600	1,754
7	Pipe Tie-Ins	2	EA	6.00	12	20.74	124.44		100.00	249		200	449
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	20.00	20	20.74	414.80		100.00	415		100	515
10	Fiberglass 2" thk. Alum. Jacket	520	LF			20.74		20			10,400		10,400
11	Electric Heat Tracing	520	LF	0.03	16	20.74	0.64		5.21	332		2,709	3,041
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6550.00	332		6,550	6,882
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187			187
15	Solvent	1	LS						200.00			200	200
16	Truck Ramps	1	LS	20.00	20	20.74	414.80		1700.00	415		1,700	2,115
	SUB-TOTAL DIRECT COST				499					\$10,342	\$10,400	\$23,575	\$44,317
	Construction Equipment Rental (Assume 4.45 Wks. Equip. Rentals)												
1	Hydraulic Crane (1 Week Only)	1	EA.					750			3,350		3,350
2	Scissor Lift (Not required)	1	EA.										
3	Fork Lift	1	EA.					225			1,000		1,000
4	Pick Up Truck	1	EA.					125			600		600
5	Fusion Weld Machine (With Operator)	1	EA.	178.00	178	20.74	3691.72			3,692	1,100		4,792
6	Fuel	1	LS					600			600		600
7	Mob. & Demob.	1	LS					900			900		900
	SUB-TOTAL (Equip. Rentals)				6,586								\$11,242

Details

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CONTR. NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

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DATE:
FILE #

999
EST. DEPT.
31-Jan-95
ORHDCPVC

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	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On The Pipe Rack, 3" HDPE SDR 7 & 6" CPVC Sch. 40												
	<u>DIRECT COST</u>												
1	Install New Pipe 3" HDPE In 6" CPVC	1	LOT		750					15,564	12,200	21,705	49,469
	<u>INDIRECT COST</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		113					2,335			2,335
2	Small Tools/Consumables	1	LOT									1,302	1,302
3	Contractor's Equipment Rentals	1	LOT								20,578		20,578
4	Temporary Facilities	1	LOT		143					1,929		1,039	2,968
5	Job Condition Factors (Weather, Height, Congestion)	1	LOT		267								5,528
5	Contractor Safety	1	LOT		72					965		519	1,484
6	Job Clean Up	1	LOT		121								2,510
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			15,000	415		15,000	15,415
	4 Changes/day for 5 men for 8 wks.												
7	CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			15,000	8,089		15,000	23,089
	Medical Exams Entry, Exit For 5 Men + 4 Hrs. Ea.												
8	Payroll Burdens & Benefits @ 52%	1	LOT							8,093			8,093
9	Overhead & Profit @ 25%	1	LOT										33,193
10	Bond @ 1%	1	LOT										1,606
11	Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT										3,274
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												13,947
2	Construction Management (4%)												7,532
	<u>ENGINEERING COST</u>												
1	A/E Subcontract Fee (10%)												19,582
	<u>CONTINGENCY (20%)</u>												43,081
	<u>TOTAL</u>				1,975					\$40,890	\$32,778	\$54,565	\$258,485

Summary

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CONTR.NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P.O. #: 999
 BY: EST. DEPT.
 DATE: 31-Jan-95
 FILE # ORHDCPVC

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On The Pipe Rack, 3' HDPE SDR 7 & 6' CPVC Sch. 40												
1	Primary 3' HDPE (Schedule 40) Pipe	480	LF	0.22	106	20.74	4.58		2.50	2,198		1,200	3,398
2	Secondary 6' CPVC (Schedule 40) Pipe	480	LF	0.60	288	20.74	12.44		15.30	5,973		7,344	13,317
3	Elbows 3' HDPE	1	LS	44.00	44	20.74	912.56		810.00	913		810	1,723
4	Elbows & Couplings 6' CPVC	1	LS	100.00	100	20.74	2074.00		1200.00	2,074		1,200	3,274
5	Spacers	1	LS	12.00	12	20.74	248.88		500.00	249		500	749
6	Pipe Supports	1	LS	68.00	87	20.74	1813.71		1100.00	1,814		1,100	2,914
7	Pipe Tie-Ins	2	EA	5.00	10	20.74	103.70		100.00	207		200	407
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	50.00	50	20.74	1037.00		150.00	1,037		150	1,187
10	Fiberglass 2' lthk. Alum. Jacket	480	LF								12,200		12,200
11	Electric Heat Tracing	480	LF	0.03	14	20.74	0.60		5.21	290		2,501	2,791
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6300.00	332		6,300	6,632
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187			187
15	Solvent	1	LS						200.00			200	200
	SUB-TOTAL DIRECT COST				750					\$15,564	\$12,200	\$21,705	\$49,469
	Contractor's Rental Equipment (Assume 8 Wks. Equip. Rentals)												
1	Hydraulic Crane (Above Grade Only)	1	EA.								6,000		6,000
2	Scissor Lift (Above Grade Only)	1	EA.								3,000		3,000
3	Fork Lift	1	EA.								1,800		1,800
4	Pick Up Truck	1	EA.								1,000		1,000
5	Fusion Weld Machine for HDPE Pipe	1	LS	240	240	20.74				4,978	1,900		6,878
6	Fuel	1	LS								1,100		1,100
7	Mob. & Demob.	1	LS								800		800
	SUB-TOTAL (Equip. Rentals)												\$20,578

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Details

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

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COST ESTIMATE DETAILS

P. O. # :
BY:
DATE:
FILE #

999
EST. DEPT.
31-Jan-95
OGCPHDPE

000042

DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
			UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
<u>SUMMARY</u>												
On Grade, 3" CPVC Sch.80 / 6" HDPE SDR 32.5												
<u>DIRECT COST</u>												
1 Install Pipe 3" CPVC In 6" HDPE SDR 32.5	1	LOT		504					10,461	10,400	17,548	38,410
<u>INDIRECT COST</u>												
1 Contractor's Supervision (Office Overhead)	1	LOT		76					1,569			1,569
2 Small Tools/Consumables	1	LOT									1,053	1,053
3 Contractor's Equipment Rentals	1	LOT		178						11,222		11,222
4 Temporary Facilities	1	LOT		111					1,498		807	2,305
5 Job Condition Factors (Weather, Height, Congestion)	1	LOT		113								2,341
5 Contractor Safety	1	LOT		56					749		403	1,152
6 Job Clean Up	1	LOT		84								1,742
6 Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			11,900	415		11,900	12,315
4 Changes/day for 5 men for 6.33 wks. Exams. 4hrs/ea.												
7 CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			15,000	8,089		15,000	23,089
Medical Exams Entry, Exit For 5 Men + 4 Hrs. Ea.												
8 Payroll Burdens & Benefits @ 52%	1	LOT							5,440			5,440
9 Overhead & Profit @ 25%	1	LOT										25,159
10 Bond @ 1%	1	LOT										1,284
11 Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12 Sales Tax on materials @ 6 %	1	LOT										2,803
<u>FIELD SUPPORT COST</u>												
1 Project Management (8%)												10,671
2 Construction Management (4%)												5,762
<u>ENGINEERING COST</u>												
1 A/E Subcontract Fee (10%)												14,982
<u>CONTINGENCY (20%)</u>												32,959
TOTAL				1,632					\$31,721	\$21,622	\$46,711	\$197,756

Summary

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CONTR.NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
 BY: EST. DEPT.
 DATE: 31-Jan-95
 FILE # OGCPHDPE

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On Grade, 3' CPVC Sch.80 / 6' HDPE SDR 32.5												
1	Primary 3' CPVC Sch.80 Pipe	520	LF	0.20	104	20.74	4.15		4.91	2,157		2,553	4,710
2	Secondary 6' HDPE SDR 32.5 Pipe	520	LF	0.33	172	20.74	6.86		1.80	3,567		936	4,503
3	Elbows & Transition Pieces, 3' CPVC	1	LS	12.00	12	20.74	248.88		200.00	249		550	799
4	Elbows 6' HDPE	1	LS	39.00	39	20.74	808.86		430.00	809		430	1,239
5	Spacers	1	LS	14.00	14	20.74	290.36		520.00	290		520	810
6	Pipe Supports (Allowance For Pipe Tie Downs)	1	LS	16.00	56	20.74	1169.74		600.00	1,170		600	1,770
7	Pipe Tie-ins	2	EA	6.00	12	20.74	124.44		100.00	249		200	449
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	20.00	20	20.74	414.80		100.00	415		100	515
10	Fiberglass 2" thk. Alum. Jacket	520	LF			20.74		20			10,400		10,400
11	Electric Heat Tracing	520	LF	0.03	16	20.74	0.64		5.21	332		2,709	3,041
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6550.00	332		6,550	6,882
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187		300	487
15	Solvent	1	LS						200.00			200	200
16	Truck Ramps	1	LS	20.00	20	20.74	414.80		1700.00	415		1,700	2,115
	SUB-TOTAL DIRECT COST				504					\$10,461	\$10,400	\$17,548	\$38,410
	Construction Equipment Rental (Assume 6.33 Wks. Equip. Rentals)												
1	Hydraulic Crane (1 Week Only)	1	EA.					750			750		750
2	Scissor Lift (Not required)	1	EA.										
3	Fork Lift	1	EA.					225			1,400		1,400
4	Pick Up Truck	1	EA.					125			800		800
5	Fusion Weld Machine (With Operator)	1	EA.	253.00	253	20.74	5247.22			5,247	1,500		6,747
6	Fuel	1	LS					900			825		825
7	Mob. & Demob.	1	LS					700			700		700
	SUB-TOTAL (Equip. Rentals)				15,406								\$11,222

6591

CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

10

COST ESTIMATE DETAILS

P. O. # : 999
BY: EST. DEPT.
DATE: 31-Jan-95
FILE # ORCPHDE

000044

DESCRIPTION		QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
SUMMARY													
On The Pipe Rack, 3" CPVC & 6" HDPE													
DIRECT COST													
1	Install New Double Wall Pipe 3" CPVC In 6" HDPE	1	LOT		541					11,223	12,200	16,502	39,925
INDIRECT COST													
1	Contractor's Supervision (Office Overhead)	1	LOT		81					1,684			1,684
2	Small Tools/Consumables	1	LOT									990	990
3	Contractor's Equipment Rentals	1	LOT		320						22,254		22,254
4	Temporary Facilities	1	LOT		116					1,557		838	2,396
5	Job Condition Factors (Weather,Height, Congestion)	1	LOT		282								5,849
5	Contractor Safety	1	LOT		58					779		419	1,198
6	Job Clean Up	1	LOT		107								2,229
6	Health Physics (Personnel Protection Equipment)	1	LOT		20	20.74			15,000	415		15,000	15,415
	4 Changes/day for 5 men for 8 wks.												
7	CERCLA Site Access Training	1	LOT		390	20.74			15,000	8,089		15,000	23,089
	Training 40 hrs/wk. for 8.0 wks. 4 Hrs./Ea. Med. Exams.												
8	Payroll Burdens & Benefits @ 52%	1	LOT							5,836			5,836
9	Overhead & Profit @ 25%	1	LOT										30,216
10	Bond @ 1%	1	LOT										1,487
11	Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT										2,925
FIELD SUPPORT COST													
1	Project Management (8%)												12,719
2	Construction Management (4%)												6,868
ENGINEERING COST													
1	A/E Subcontract Fee (10%)												17,858
CONTINGENCY (20%)													
TOTAL													
					2,015					\$33,082	\$34,454	\$48,749	\$235,724

Summary

CONTR.NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
 BY: EST. DEPT.
 DATE: 31-Jan-95
 FILE # ORCPHDP

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On The Pipe Rack, 3" CPVC & 6" HDPE												
1	Primary 3" CPCV (Schedule 40) Pipe	480	LF	0.20	96	20.74	4.15		4.91	1,991		2,357	4,348
2	Secondary 6" HDPE SDR 32.5 Pipe	480	LF	0.33	158	20.74	6.83		1.80	3,277		864	4,141
3	Elbows & Couplings 3" CPVC	1	LS	42.00	42	20.74	871.08		380.00	871		380	1,251
4	Elbows 6" HDPE	1	LS	60.00	60	20.74	1244.40		1750.00	1,244		1,750	2,994
5	Spacers	1	LS	12.00	12	20.74	248.88		500.00	249		500	749
6	Pipe Supports	1	LS	68.00	60	20.74	1247.51		1100.00	1,248		1,100	2,348
7	Pipe Tie-ins	2	EA	5.00	10	20.74	103.70		100.00	207		200	407
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	50.00	50	20.74	1037.00		150.00	1,037		150	1,187
10	Fiberglass 2" thk. Alum. Jacket	480	LF								12,200		12,200
11	Electric Heat Tracing	480	LF	0.03	14	20.74	0.60		5.21	290		2,501	2,791
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6300.00	332		6,300	6,632
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187			187
15	Solvent	1	LS						200.00			200	200
	SUB-TOTAL DIRECT COST				541					\$11,223	\$12,200	\$16,502	\$39,925
	Contractor's Rental Equipment (Assume 8.0 Wks. Equip. Rentals)												
1	Hydraulic Crane	1	EA								6,000		6,000
2	Scissor Lift	1	EA								3,000		3,000
3	Fork Lift	1	EA								1,800		1,800
4	Pick Up Truck	1	EA								1,000		1,000
5	Fusion Weld Machine for HDPE Pipe - Operator	1	LS	316	316	20.74				6,554	1,900		8,454
6	Fuel	1	LS								1,100		1,100
7	Mob. & Demob.	1	LS								900		900
	SUB-TOTAL (Equip. Rentals)												\$22,254

Details

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

11

COST ESTIMATE DETAILS

P. O. # :
BY:
DATE:
FILE #

999
EST. DEPT.
03-Feb-95
OGCPCPVC

000046

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On Grade, 3" CPVC Sch.80 / 6" CPVC Sch.40 Pipe												
	<u>DIRECT COST</u>												
1	Install New Pipe 3" CPVC In 6" CPVC (From Page 2 Of 2)	1	LOT		457					9,478	10,301	24,588	44,368
	<u>INDIRECT COSTS</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		69					1,422			1,422
2	Small Tools/Consumables	1	LOT									1,475	1,475
3	Contractor's Equipment Rentals	1	LOT								3,260		3,260
4	Temporary Facilities	1	LOT		128					1,730		932	2,662
5	Job Condition Factors (Weather, Height, Congestion)	1	LOT		92								1,906
6	Contractor Safety	1	LOT		64					865		466	1,331
7	Job Clean Up	1	LOT		82								1,693
8	Health Physics (Personnel Protective Clothing) 4 Changes / day for 5 men for 5 wks.	1	LOT		20	20.74			9,375	415		9,375	9,790
9	CERCLA (40 Hrs./ Man) Site Training (74 Hrs./ Man) Medical Exams Entry, Exit For 5 Men + 4 Hrs. Ea.	1	LOT		390	20.74			15,000	8,089		15,000	23,089
10	Payroll Burdens & Benefits @ 52%	1	LOT							4,929			4,929
11	Overhead & Profit @ 25%	1	LOT										23,981
12	Bond @ 1%	1	LOT										1,237
13	Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
14	Sales Tax on materials @ 6 %	1	LOT										3,110
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												10,220
2	Construction Management (4%)												5,519
	<u>ENGINEERING COST</u>												
1	A/E Subcontract Fee (10%)												14,349
	<u>CONTINGENCY (20%)</u>												31,568
	<u>TOTAL</u>				1,402					\$30,427	\$13,561	\$51,836	\$189,408

Summary

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
BY: EST. DEPT.
DATE: 03-Feb-95
FILE # OGCPCPVC

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>On Grade, 3" CPVC Sch.80 / 6" CPVC Sch.40 Pipe</u>												
1	Primary 3" CPVC Sch.80 Pipe	520	LF	0.20	104	20.74	4.15		4.91	2,157		2,553	4,710
2	Secondary 6" CPVC Sch.40 Pipe	520	LF	0.24	125	20.74	4.99		15.30	2,593		7,956	10,549
3	Elbows & Couplings 3" CPVC	1	LS	33.00	33	20.74	684.42		310.00	684		310	994
4	Elbows & Couplings 6" CPVC	1	LS	58.00	58	20.74	1202.92		990.00	1,203		990	2,193
5	Spacers	1	LS	14.00	14	20.74	290.36		520.00	290		520	810
6	Pipe Supports (Allowance For Pipe Tie Downs)	1	LS	16.00	16	20.74	331.84		600.00	332		600	932
7	Pipe Tie-ins	2	EA	6.00	12	20.74	124.44		100.00	249		200	449
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	20.00	20	20.74	414.80		100.00	415		100	515
10	Fiberglass 2" thk. Alum. Jacket	520	LF					20			10,301		10,301
11	Electric Heat Tracing	520	LF	0.03	16	20.74	0.64		5.21	332		2,709	3,041
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6550.00	332		6,550	6,882
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187			187
15	Solvent	1	LS						200.00			200	200
16	Truck Ramps	1	LS	20.00	20	20.74	414.80		1700.00	415		1,700	2,115
	SUB-TOTAL DIRECT COST				457					\$9,478	\$10,301	\$24,588	\$44,368
	Contractor's Rental Equipment (Assume 5.0 Wks. Equip. Rentals)												
1	Hydraulic Crane (1 Week Only)	1	EA.								750		750
2	Scissor Lift (Above Grade Only)	1	EA.										
3	Fork Lift	1	EA.								1,000		1,000
4	Pick Up Truck	1	EA.								560		560
5	Fusion Weld Machine for HDPE Pipe (Not Required)												
6	Fuel	1	LS								500		500
7	Mob. & Demob.	1	LS								450		450
	SUB-TOTAL (Equip. Rentals)												\$3,260

Details

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CONTR. NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

12

COST ESTIMATE DETAILS

P. O. # :
BY:
DATE:
FILE #

999
EST. DE
03-Feb-95
ORCPVC

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On The Pipe Rack, 3" CPVC. Sch.40 / 6" CPVC Sch.40												
	<u>DIRECT COST</u>												
1	Install New Pipe 3" CPVC In 6" CPVC	1	LOT		737					15,278	12,200	22,452	49,930
	<u>INDIRECT COST</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		110					2,292			2,292
2	Small Tools/Consumables	1	LOT									1,347	1,347
3	Contractor's Equipment Rentals	1	LOT								13,700		13,700
4	Temporary Facilities	1	LOT		144					1,947		1,049	2,996
5	Job Condition Factors (Weather, Height, Congestion)	1	LOT		264								5,471
5	Contractor Safety	1	LOT		72					974		524	1,498
6	Job Clean Up	1	LOT		112								2,317
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			15,000	415		15,000	15,415
	4 Changes/day for 5 men for 8 wks.												
7	CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			15,000	8,089		15,000	23,089
	Medical Exams Entry, Exit For 5 Men + 4 Hrs. Ea.												
8	Payroll Burdens & Benefits @ 52%	1	LOT							7,945			7,945
9	Overhead & Profit @ 25%	1	LOT										31,499
10	Bond @ 1%	1	LOT										1,538
11	Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT										3,322
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												13,269
2	Construction Management (4%)												7,165
	<u>ENGINEERING COST</u>												
1	A/E Subcontract Fee (10%)												18,629
	<u>CONTINGENCY (20%)</u>												40,984
	<u>TOTAL</u>				1,949					\$40,439	\$25,900	\$55,371	\$245,904

Summary

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CONTR.NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
 BY: EST. DEPT.
 DATE: 03-Feb-95
 FILE # ORCPCPVC

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On The Pipe Rack, 3" CPVC, Sch.40 / 6" CPVC Sch.40												
1	Primary 3" CPVC (Schedule 40) Pipe	480	LF	0.20	96	20.74	4.15		4.91	1,991		2,357	4,348
2	Secondary 6" CPVC Pipe (Schedule 40)	480	LF	0.60	288	20.74	12.44		15.30	5,973		7,344	13,317
3	Elbows & Couplings 3" C.S.	1	LS	42.00	42	20.74	871.08		400.00	871		400	1,271
4	Elbows & Couplings 6" CPVC	1	LS	100.00	100	20.74	2074.00		1200.00	2,074		1,200	3,274
5	Spacers	1	LS	12.00	12	20.74	248.88		500.00	249		500	749
6	Pipe Supports	1	LS	68.00	86	20.74	1776.38		1100.00	1,776		1,100	2,876
7	Pipe Tie-Ins	2	EA	5.00	10	20.74	103.70		100.00	207		200	407
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	50.00	50	20.74	1037.00		150.00	1,037		150	1,187
10	Fiberglass 2" thk. Alum. Jacket	480	LF								12,200		12,200
11	Electric Heat Tracing	480	LF	0.03	14	20.74	0.60		5.21	290		2,501	2,791
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6300.00	332		6,300	6,632
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187			187
15	Solvent	1	LS						200.00			200	200
	SUB-TOTAL DIRECT COST				737					\$15,278	\$12,200	\$22,452	\$49,930
	Contractor's Rental Equipment (Assume 8 Wks. Equip. Rentals)												
1	Hydraulic Crane	1	EA.				5,250				6,000		6,000
2	Scissor Lift	1	EA.				2,625				3,000		3,000
3	Fork Lift	1	EA.				1,575				1,800		1,800
4	Pick Up Truck	1	EA.				875				1,000		1,000
5	Fusion Weld Machine for HDPE Pipe (Not Required)												
6	Fuel	1	LS								1,100		1,100
7	Mob. & Demob.	1	LS								800		800
	SUB-TOTAL (Equip. Rentals)										\$13,700		\$13,700

Details

6591

CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

13

COST ESTIMATE DETAILS

P. O. # : 999
BY: EST. DEPT.
DATE: 03-Feb-95
FILE # OGHOSE

050000

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On Grade, 3" Hose / 6" HDPE SDR 32.5 Pipe												
	<u>DIRECT COST</u>												
1	Install Pipe 3" Hose In 6" HDPE Pipe	1	LOT		335					6,955	10,400	19,736	37,091
	<u>INDIRECT COST</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		50					1,043			1,043
2	Small Tools/Consumables	1	LOT									1,184	1,184
3	Contractor's Equipment Rentals	1	LOT		178						29,300		29,300
4	Temporary Facilities	1	LOT		107					1,447		779	2,225
5	Job Condition Factors (Weather, Height, Congestion)	1	LOT		95								1,974
5	Contractor Safety	1	LOT		54					723		389	1,113
6	Job Clean Up	1	LOT		107								2,218
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			9,850	415		9,850	10,265
	4 Changes/day for 5 men for 5.25 wks. Exams. 4hrs/ea.												
7	CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			15,000	8,089		15,000	23,089
	Medical Exams Entry, Exit For 5 Men + 4 Hrs. Ea.												
8	Payroll Burdens & Benefits @ 52%	1	LOT							3,617			3,617
9	Overhead & Profit @ 25%	1	LOT										28,280
10	Bond @ 1%	1	LOT										1,409
11	Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT										2,816
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												11,930
2	Construction Management (4%)												6,442
	<u>ENGINEERING COST</u>												
1	A/E Subcontract Fee (10%)												16,750
	<u>CONTINGENCY (20%)</u>												36,849
	<u>TOTAL</u>				1,437					\$25,788	\$39,700	\$46,939	\$221,094

Summary

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CONTR.NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
 BY: EST. DEPT.
 DATE: 03-Feb-95
 FILE # OGHOSE

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>On Grade, 3" Hose / 6" HDPE SDR 32.5 Pipe</u>												
1	Primary 3" Hose, 100 Ft. Lengths, Nat. Rubber	520	LF	0.08	39	20.74	1.56		1.80	809		936	1,745
2	Secondary 6" HDPE Pipe SDR 32.5	520	LF	0.21	111	20.74	4.43		15.30	2,302		7,956	10,258
3	Elbows (Not Required)	1	LS										
4	Elbows 6" HDPE	1	LS	32.00	32	20.74	663.68		135.00	664		135	799
5	Spacers	1	LS	14.00	12	20.74	248.88		150.00	249		150	399
6	Pipe Supports (Allowance For Pipe Tie Downs)	1	LS	16.00	34	20.74	712.42		600.00	712		600	1,312
7	Pipe Tie-ins	2	EA	6.00	12	20.74	124.44		100.00	249		200	449
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	20.00	20	20.74	414.80		100.00	415		100	515
10	Fiberglass 2" Thk. Alum. Jacket	520	LF			20.74		20			10,400		10,400
11	Electric Heat Tracing	520	LF	0.03	16	20.74	0.64		5.21	332		2,709	3,041
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6550.00	332		6,550	6,882
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187			187
15	Truck Ramps	1	LS	20.00	20	20.74	414.80		200.00	415		200	615
	SUB-TOTAL DIRECT COST				335					\$6,955	\$10,400	\$19,736	\$37,091
	Construction Equipment Rental (Assume 5.25 Wks. Equip. Rentals)												
1	Hydraulic Crane (1 Week Only)	1	EA.					750			3,900		3,900
2	Scissor Lift (Not required)	1	EA.										
3	Fork Lift	1	EA.					225			1,200		1,200
4	Pick Up Truck	1	EA.					125			650		650
5	Fusion Weld Machine (With Operator)	1	EA.	210.00	210	20.74	4355.40			4,355	1,250		5,605
6	Fuel	1	LS					600			600		600
7	Mob. & Demob.	1	LS					900			900		900
	SUB-TOTAL (Equip. Rentals)				14,902						\$29,300		\$12,855

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

#15

COST ESTIMATE DETAILS

P. O. #: 999
BY: EST. DEPT.
DATE: 31-Jan-95
FILE # OGH052

DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
			UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
SUMMARY												
On Grade, 3" Hose, Flanged, 100 Ft. Lengths												
DIRECT COST												
1 Install 3" Rubber SBR Blend Hose	1	LOT		147					3,044	10,400	13,939	27,383
INDIRECT COST												
1 Contractor's Supervision (Office Overhead)	1	LOT		22					457			457
2 Small Tools/Consumables	1	LOT									836	836
3 Contractor's Equipment Rentals	1	LOT		178						23,050		23,050
4 Temporary Facilities	1	LOT		79					1,068		575	1,643
5 Job Condition Factors (Weather, Height, Congestion)	1	LOT		66								1,365
5 Contractor Safety	1	LOT		40					534		288	821
6 Job Clean Up	1	LOT		80								1,667
6 Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			9,850	415		9,850	10,265
4 Changes/day for 5 men for 3.6 wks. Exams. 4hrs/ea												
7 CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			15,000	8,089		15,000	23,089
Medical Exams Entry, Exit For 5 Men + 4 Hrs. Ea.												
8 Payroll Burdens & Benefits @ 52%	1	LOT							1,583			1,583
9 Overhead & Profit @ 25%	1	LOT										23,040
10 Bond @ 1%	1	LOT										1,200
11 Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12 Sales Tax on materials @ 6 %	1	LOT										2,429
FIELD SUPPORT COST												
1 Project Management (8%)												9,786
2 Construction Management (4%)												5,285
ENGINEERING COST												
1 A/E Subcontract Fee (10%)												13,740
CONTINGENCY (20%)												30,227
TOTAL												
				1,122					\$18,688	\$33,450	\$40,488	\$181,364

Summary

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CONTR.NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
 BY: EST. DEPT.
 DATE: 31-Jan-95
 FILE # OGH052

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On Grade, 3" Hose, Flanged, 100 Ft. Lengths												
1	Primary 3" Hose, 100 Ft. Lengths, Nat. Rubber	520	LF	0.08	39	20.74	1.56		6.50	809		3,380	4,189
2	Secondary Pipe (Not Included)												
3	Elbows (Not Included)												
4	Elbows (Not Included)												
5	Spacers (Not Included)												
6	Pipe Supports (Allowance For Pipe Tie Downs)	1	LS	16.00	10	20.74	202.22		600.00	202		600	802
7	Pipe Tie-ins	2	EA	6.00	12	20.74	124.44		100.00	249		200	449
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	20.00	20	20.74	414.80		100.00	415		100	515
10	Fiberglass 2" thk. Alum. Jacket	520	LF			20.74		20			10,400		10,400
11	Electric Heat Tracing	520	LF	0.03	16	20.74	0.64		5.21	332		2,709	3,041
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6550.00	332		6,550	6,882
14	Drain Connection for Pumpout (Not Included)												
15	Truck Ramps	1	LS	20.00	20	20.74	414.80		200.00	415		200	615
	SUB-TOTAL DIRECT COST				147					\$3,044	\$10,400	\$13,939	\$27,383
	Construction Equipment Rental (Assume 3.6 Wks. Equip. Rentals)												
1	Hydraulic Crane	1	EA.										
2	Scissor Lift (Not required)	1	EA.										
3	Fork Lift	1	EA.					225			800		800
4	Pick Up Truck	1	EA.					125			450		450
5	Fusion Weld Machine (With Operator)	1	EA.										
6	Fuel	1	LS					500			500		500
7	Mob. & Demob.	1	LS					500			500		500
	SUB-TOTAL (Equip. Rentals)				21,622						\$23,050		\$2,250

Details

27-0000053

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CONTR.NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
 BY: EST. DEPT.
 DATE: 31-Jan-85
 FILE # ORHOSE

	DESCRIPTION	QUAN	UNIT	MANHOURS		COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L			
	<u>SUMMARY</u>											
	On The Pipe Rack, 3" Hose, Flanged, 100 Ft. Lengths											
	<u>DIRECT COST</u>											
1	Install New 3" Hose	1	LOT		134				2,778	12,000	13,771	28,549
	<u>INDIRECT COST</u>											
1	Contractor's Supervision (Office Overhead)	1	LOT		20				417			417
2	Small Tools/Consumables	1	LOT								826	826
3	Contractor's Equipment Rentals	1	LOT							29,400		29,400
4	Temporary Facilities	1	LOT		83				1,113		600	1,713
5	Job Condition Factors (Weather, Height, Congestion)	1	LOT		92							1,913
5	Contractor Safety	1	LOT		41				557		300	856
6	Job Clean Up	1	LOT		92							1,910
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			415		5,625	6,040
	4 Changes/day for 5 men for 3 wks.											
7	CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			8,089		15,000	23,089
	Medical Exams Entry, Exit For 5 Men + 4 Hrs. Ea.											
8	Payroll Burdens & Benefits @ 52%	1	LOT						1,445			1,445
9	Overhead & Profit @ 25%	1	LOT									24,039
10	Bond @ 1%	1	LOT									1,240
11	Rad. Tech. Delays	1	LOT		100	35			3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT									2,167
	<u>FIELD SUPPORT COST</u>											
1	Project Management (8%)											10,168
2	Construction Management (4%)											5,491
	<u>ENGINEERING COST</u>											
1	A/E Subcontract Fee (10%)											14,276
	<u>CONTINGENCY (20%)</u>											31,408
	<u>TOTAL</u>				972				\$18,313	\$41,400	\$36,121	\$188,447

Summary

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CONTR.NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
 BY: EST. DEPT.
 DATE: 31-Jan-95
 FILE # ORHOSE

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On The Pipe Rack, 3" Hose, Flanged, 100 Ft. Lengths												
1	Primary 3" Hose, 100 Ft. Lengths Nat. Rubber	480	LF	0.08	38	20.74	1.64		6.50	788		3,120	3,908
2	Secondary Pipe (Not Included)												
3	Elbows & Couplings (Not Included)												
4	Elbows & Couplings (Not Included)												
5	Spacers (Not Included)												
6	Pipe Supports	1	LS	68.00	11	20.74	227.10		1100.00	227		1,100	1,327
7	Pipe Tie-ins	2	EA	6.00	12	20.74	124.44		100.00	249		200	449
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing	1	LS	20.00	20	20.74	414.80		100.00	415		100	515
10	Fiberglass 2" thk. Alum. Jacket	480	LF					25			12,000		12,000
11	Electric Heat Tracing	480	LF	0.03	14	20.74	0.64		5.21	290		2,501	2,791
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System	1	LS	16.00	16	20.74	331.84		6550.00	332		6,550	6,882
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187			187
	SUB-TOTAL DIRECT COST				134					\$2,778	\$12,000	\$13,771	\$28,549
	Contractor's Rental Equipment (Assume 3 Wks. Equip. Rentals)												
1	Hydraulic Crane	1	EA.								2,300		2,300
2	Scissor Lift	1	EA.								1,200		1,200
3	Fork Lift	1	EA.								700		700
4	Pick Up Truck	1	EA.								400		400
5	Fusion Weld Machine for HDPE Pipe												
6	Fuel	1	LS								400		400
7	Mob. & Demob.	1	LS								400		400
	SUB-TOTAL (Equip. Rentals)										\$29,400		\$5,400

Details

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

17

COST ESTIMATE DETAILS

P. O. # : 999
BY: EST. DEPT.
DATE: 03-Feb-95
FILE # ORCSEXT

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On Pipe Rack, 3' Cstl. (Exist.) / 10" HDPE SDR 32.5												
	<u>DIRECT COST</u>												
1	Install 3' Cstl. Sch. 40 / 6 5/8" 10 Gage Double Containment Pipe System	1	LOT		1,039					21,549	8,640	23,313	53,502
	<u>INDIRECT COST</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		156					3,232			3,232
2	Small Tools/Consumables	1	LOT									1,399	1,399
3	Contractor's Equipment Rentals	1	LOT		340	20.74				7,052	30,350		37,402
4	Temporary Facilities	1	LOT		155					2,087		1,124	3,210
5	Job Condition Factors (Weather, Height, Congestion)	1	LOT		429								8,907
5	Contractor Safety	1	LOT		77					1,043		562	1,605
6	Job Clean Up	1	LOT		158								3,278
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			16,800	415		16,800	17,215
7	4 Changes/day for 6 men for 8.5 wks. Exams. 4hrs/ea.												
7	CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		468	20.74			18,000	9,706		18,000	27,706
	Medical Exams Entry, Exit For 6 Men + 4 Hrs. Ea.												
8	Payroll Burdens & Benefits @ 52%	1	LOT							11,205			11,205
9	Overhead & Profit @ 25%	1	LOT										42,165
10	Bond @ 1%	1	LOT										1,965
11	Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT										3,672
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												17,597
2	Construction Management (4%)												9,502
	<u>ENGINEERING COST</u>												
1	A/E Subcontract Fee (10%)												24,706
	<u>CONTINGENCY (30%)</u>												81,531
	<u>TOTAL</u>				2,943					\$59,789	\$38,990	\$61,198	\$353,300

Summary

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CONTR. NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
 BY: EST. DEPT.
 DATE: 03-Feb-95
 FILE # ORCSEXST

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On Pipe Rack, 3" Cstl. (Exist.) / 10" HDPE SDR 32.5												
1	Remove Exist. 3" Pipe Supports, Add Supp't. Steel	480	LF	0.34	163	20.74	7.04		15.50	3,381		7,440	10,821
2	Cut, Jack, Existing 3" Insulated Pipe	480	LF	0.46	221	20.74	9.55			4,584			4,584
3	Remove Tracer Loops & Trap Stations (For Pipe Sleeve Installation)	1	LS	19.00	19	20.74	394.06			394			394
4	Install Electric Heat Traco	480	LS	0.04	19	20.74	0.82		8.20	394		3,936	4,330
5	Install Pipe Spacers	1	LS	28.00	28	20.74	580.72		1020.00	581			
6	Reweld Existing 3" Carbon Stl. Pipe	1	LS	59.00	59	20.74	1223.66		100.00	1,224		100	1,324
7	Install Leak Detection System	480	LF	0.03	16	20.74	0.69		13.13	332		6,302	6,634
8	Repair Pipe Insulation & Jacket	480	LF					18			8,640		8,640
9	Install 10" HDPE Pipe Sleeve On Existing 3" Pipe	480	LF	0.80	384	20.74	16.59		2.00	7,964		960	8,924
10	Install 10" HDPE Pipe Fittings (Special Fabrication)	1	LS	57.00	57	20.74	1182.18		3925.00	1,182		3,925	5,107
11	Rework Shooting Penetrations	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
12	Drain Connection For Pump Out	1	LS	9.00	9	20.74	186.66		300.00	187		300	487
13	Pipe Tie Ins	1	LS										
14	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
15	Pipe Testing	1	LS	50.00	50	20.74	1037.00		150.00	1,037		150	1,187
	SUB-TOTAL DIRECT COST				1,039					\$21,549	\$8,640	\$23,313	\$53,502
	Construction Equipment Rental (Assume 8.5 Wks. Equip. Rentals)												
1	Hydraulic Crane	1	EA.								6,400		6,400
2	Scissor Lifts	2	EA.								6,400		6,400
3	Fork Lifts	1	EA.								3,850		3,850
4	Pick Up Truck	1	EA.								1,100		1,100
5	Fusion Weld Machine W/Operator	1	EA.	340.00	340	20.74	7051.60			7,052	10,400		17,452
6	Fuel	1	LS								1,200		1,200
7	Mob. & Demob.	1	LS								1,000		1,000
						20.74							
	SUB-TOTAL (Equip. Rentals)				340					\$7,052	\$30,350		\$37,402

Details

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

18

COST ESTIMATE DETAILS

P. O. # :
BY:
DATE:
FILE #

999
EST. DPT
03-Feb-95
OGPREFAB

8500058

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On Grade, 3" Double Containment System Complete												
	<u>DIRECT COST</u>												
1	Install 3" Cstl. Sch.40 / 6 5/8" 10 Gage Double Containment Pipe System	1	LOT		164					3,403		67,480	70,883
	<u>INDIRECT COST</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		25					511			511
2	Small Tools/Consumables	1	LOT									4,049	4,049
3	Contractor's Equipment Rentals	1	LOT		178						4,990		4,990
4	Temporary Facilities	1	LOT		205					2,764		1,489	4,253
5	Job Condition Factors (Weather,Height, Congestion)	1	LOT		92								1,914
5	Contractor Safety	1	LOT		103					1,382		744	2,127
6	Job Clean Up	1	LOT		128								2,662
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			9,375	415		9,375	9,790
7	4 Changes/day for 5 men for 5 wks. Exams.4hrs/ea.												
7	CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			15,000	8,089		15,000	23,089
	Medical Exams Entry,Exit For 5 Men + 4 Hrs. Ea.												
8	Payroll Burdens & Benefits @ 52%	1	LOT							1,770			1,770
9	Overhead & Profit @ 25%	1	LOT										31,509
10	Bond @ 1%	1	LOT										1,538
11	Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT										5,888
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												13,478
2	Construction Management (4%)												7,278
	<u>ENGINEERING COST</u>												
1	A/E Subcontract Fee (10%)												18,923
	<u>CONTINGENCY (20%)</u>												41,630
	<u>TOTAL</u>				1,405					\$21,834	\$4,990	\$98,137	\$249,780

Summary

CONTR.NO.
 CLIENT U.S. DEPT. OF ENERGY
 PROJECT
 LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
 BY: EST. DEPT.
 DATE: 03-Feb-95
 FILE # OGPREFAB

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On Grade, 3" Double Containment System Complete												
1	3" Cstl. Sch.40 / 6 5/8" 10 Gage D.C. Pipe System	520	LF	0.19	99	20.74	3.95		120.00	2,053		62,400	64,453
2	Secondary Pipe (Included Above)												
3	Elbows, Couplings Etc. (Included Above)												
4	Elbows & Couplings (Included Above)												
5	Spacers (Included Above)												
6	Pipe Supports (Allowance For Pipe Tie Downs)	1	LS	16.00	20	20.74	416.87		600.00	417		600	1,017
7	Pipe Tie-ins	2	EA	6.00	12	20.74	124.44		100.00	249		200	449
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing (Included Above)												
10	Foam Insulation, FRP Jacket (Included Above)												
11	Electric Heat Tape (Included Above)	520	LF	0.03	5	20.74	0.20		1.50	104		780	884
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System (Included Above)	1	LS	5.00	5	20.74	103.70		1300.00	104		1,300	1,404
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187		300	487
15	Truck Ramps	1	LS	20.00		20.74			1700.00			1,700	1,700
	SUB-TOTAL DIRECT COST				164					\$3,403		\$67,480	\$70,883
	Construction Equipment Rental (Assume 5 Wks. Equip. Rentals)												
1	Hydraulic Crane (1 Week Only)	1	EA.					750			750		750
2	Scissor Lift (Not required)	1	EA.										
3	Fork Lift	1	EA.					225			1,125		1,125
4	Pick Up Truck	1	EA.					125			625		625
5	Fusion Weld Machine (With Operator)	1	EA.	200.00	200	20.74	4148.00			4,148	1,190		5,338
6	Fuel	1	LS					700			700		700
7	Mob. & Demob.	1	LS					600			600		600
						20.74							
	SUB-TOTAL (Equip. Rentals)				23,004						\$4,990		\$9,138

Details

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CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

#19

COST ESTIMATE DETAILS

P. O. # :
BY:
DATE:
FILE #

999
EST. DEPT.
03-Feb-95
ORPREFAB

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>SUMMARY</u>												
	On Rack, 3" Double Containment System Complete												
	<u>DIRECT COST</u>												
1	Install 3" Cstl. Sch.40 / 6 5/8" 10 Gage Double Containment Pipe System	1	LOT		156					3,235		67,101	70,336
	<u>INDIRECT COST</u>												
1	Contractor's Supervision (Office Overhead)	1	LOT		23					485			485
2	Small Tools/Consumables	1	LOT									4,026	4,026
3	Contractor's Equipment Rentals	1	LOT								7,738		7,738
4	Temporary Facilities	1	LOT		203					2,743		1,477	4,220
5	Job Condition Factors (Weather, Height, Congestion)	1	LOT		155								3,214
5	Contractor Safety	1	LOT		102					1,372		739	2,110
6	Job Clean Up	1	LOT		133								2,764
6	Health Physics (Personnel Protective Clothing)	1	LOT		20	20.74			8,438	415		8,438	8,852
	4 Changes/day for 5 men for 4.5 wks. Exams.4hrs/ea.												
7	CERCLA (40 Hrs./Man) Site Training (74 Hrs./Man)	1	LOT		390	20.74			15,000	8,089		15,000	23,089
	Medical Exams Entry,Exit For 5 Men + 4 Hrs. Ea.												
8	Payroll Burdens & Benefits @ 52%	1	LOT							1,682			1,682
9	Overhead & Profit @ 25%	1	LOT										32,129
10	Bond @ 1%	1	LOT										1,563
11	Rad. Tech. Delays	1	LOT		100	35				3,500			3,500
12	Sales Tax on materials @ 6 %	1	LOT										5,807
	<u>FIELD SUPPORT COST</u>												
1	Project Management (8%)												13,721
2	Construction Management (4%)												7,409
	<u>ENGINEERING COST</u>												
1	A/E Subcontract Fee (10%)												19,265
	<u>CONTINGENCY (20%)</u>												42,382
	<u>TOTAL</u>				1,283					\$21,521	\$7,738	\$96,780	\$254,293

Summary

PAGE 1 OF 2

CONTR.NO.
CLIENT U.S. DEPT. OF ENERGY
PROJECT
LOCATION FERNALD, OHIO

COST ESTIMATE DETAILS

P. O. # : 999
BY: EST. DEPT.
DATE: 03-Feb-95
FILE # ORPREFAB

	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	On Rack, 3" Double Containment System Complete												
1	3" Cstl. Sch.40 / 6 5/8" 10 Gage D.C. Pipe System	480	LF	0.19	91	20.74	3.93		120.00	1,887		57,600	59,487
2	Secondary Pipe (Included Above)												
3	Elbows, Couplings Etc. (Included Above)												
4	Elbows & Couplings (Included Above)												
5	Spacers (Included Above)												
6	Pipe Supports (Included Above)												
7	Pipe Tie-ins	2	EA	6.00	12	20.74	124.44		100.00	249		200	449
8	Pipe Identification	1	LS	2.00	2	20.74	41.48		100.00	41		100	141
9	Pipe Testing (Included Above)												
10	Foam Insulation, FRP Jacket (Included Above)												
11	Electric Heat Tape (Included Above)	480	LF	0.03	14	20.74	0.60		5.21	290		2,501	2,791
12	Sheeting Penetration	1	LS	12.00	12	20.74	248.88		100.00	249		100	349
13	Leak Detection System (Included Above)	1	LS	16.00	16	20.74	331.84		6300.00	332		6,300	6,632
14	Drain Connection for Pumpout	1	LS	9.00	9	20.74	186.66		300.00	187		300	487
	SUB-TOTAL DIRECT COST				156					\$3,235		\$67,101	\$70,336
	Construction Equipment Rental (Assume 4.5 Wks. Equip. Rentals)												
1	Hydraulic Crane	1	EA.								3,375		3,375
2	Scissor Lift	1	EA.								1,688		1,688
3	Fork Lift	1	EA.								1,013		1,013
4	Pick Up Truck	1	EA.								563		563
5	Fusion Weld Machine	1	EA.										
6	Fuel	1	LS							600			600
7	Mob. & Demob.	1	LS							500			500
	SUB-TOTAL (Equip. Rentals)									\$7,738			\$7,738

Details

000061

000061

4.3 Alternative No. 2 - Truck Transfer

4.3.1 Scope

Alternative 2 involves transfer of UNH material from nine (9) UNH tanks using a nominal 5000 gallon single-wall stainless steel tanker truck and unloaded into either one of the two dilution/neutralization tanks (F1-25 or F1-26). The nine (9) UNH tanks are those tanks which would have otherwise been transferred through piping that is not constructed in secondary containment as required by DOE Order 6430.1A, "General Design Criteria." These include: 4 NFS Area tanks, 1 OK Liquor tank, and 4 Hot Raffinate tanks. Neutralized slurry (MDU) will then be transferred from Plant 2/3 to Plant 8 for filtering using either the existing, or the soon to be procured, nominal 3,000 gallon Supersucker™ truck.

It is assumed that the UNH from the remaining nine (9) UNH tanks, located within the combined CD Blend and Plant 2/3 secondary containment area, will be transferred as planned using the progressive cavity pump skids to the dilution/neutralization tanks (i.e., their transmission piping is within secondary containment).

Transfer of filtrate from Plant 8 to Plant 2/3 for UNH tank rinsing, as currently planned, is not considered in this Alternative. Remaining volume will be left in the dilution/neutralization tanks as dilution water for subsequent batches. Subsection 4.3.2 details the number of total truck transfers anticipated to be approximately one hundred twenty-six.

Alternative 2 will involve construction of four new concrete loading and unloading pads with secondary containment and ancillary piping at the NFS Area tanks, OK Liquor Tanks, Hot Raffinate Area, and the West side of Plant 2/3. The rough order of magnitude cost for the construction is estimated at \$419,000. Further information is provided in ATTACHMENT 3.

The preliminary schedule for Alternative 2 is presented in Subsection 4.3.4. The sequence of activities are assumed to occur in a manner similar to the present project schedule and detailed in ATTACHMENT 4. The schedule assumes a start date of February 27, 1995, for concrete pad design; providing only a short period for DOE and Ohio EPA discussion and concurrence. The resulting early start to commence operations is projected as August 11, 1995.

4.3.2 Truck Transfers

As identified on Table 1, approximately one hundred twenty-six truck transfers (some full, some partial) or a total of two hundred fifty-two loading and unloading operations would be needed to complete this Alternative. The truck transfer operation assumes that a single UNH truck transfer will contain only the contents from a single tank, i.e., no inter-tank mixing. Additionally, it is assumed that only the neutralized volume resulting from the combined volume of UNH and MgO will be transferred from Plant 2/3 to Plant 8. Remaining volume will be left in dilution/neutralization Tank F1-25 or F1-26 in Plant 2/3, as dilution water for subsequent batches.

The truck transfer calculations assume a single-walled stainless steel tanker truck with a nominal capacity of 5,000 gallons will be used for UNH transfers. This truck is currently under procurement as part of the CERCLA/RCRA (CRU)1 Dewatering Excavation Evaluation Program (DEEP) Project. This Alternative assumes that the 5,000 gallon DEEP truck will transport UNH from satellite UNH tanks to Plant 2/3 for neutralization. Meanwhile, either the second Supersucker™ truck being procured by FERMC0 Operations (nominal capacity of 3,000 gallons), or the existing Supersucker™ truck will transport neutralized slurry from Plant 2/3 to Plant 8 for filtration.

In order to provide adequate environmental protection during truck loading and unloading operations, secondary containment vehicle pads will be required. Loading and unloading operations will occur at five locations. These include loading UNH tank contents at the three satellite UNH storage areas; (NFS, OK Liquor, and Hot Raffinate), unloading UNH and loading MDU slurry at Plant 2/3, and unloading MDU slurry at Plant 8. Since Plant 8 currently has a loading/unloading pad with secondary containment, only four new pads will be required to be constructed. These four containment pads must be designed to meet the requirements of DOE Order 6430.1, Ohio Administrative Code, RCRA, and SPCC. The containment pads (approximately 45' x 15') must be designed to accommodate the vehicle size and weights that are anticipated (approximately 72,000 pounds tare weight). Provisions in the design and operation of the containment pads must include removal of water after each stormwater event.

Any truck leaving a contamination area will require radiological monitoring. Plants 2/3 and 8 and all satellite UNH storage areas are in contaminated controlled Zone II areas. However, the roadways connecting these areas are in Zone I areas. Therefore, monitoring could become a significant cost and schedule concern. For safety purposes, streets may require closure during transfer of UNH and MDU slurry. This would affect other FEMP operations in the local area, vehicle traffic, emergency response, and waste management operations.

Standard Operating Procedures must be developed for all phases of truck loading and unloading operations. Lesson Plans, System Operability Test Procedure, personnel qualifications, and simulation training will be required, in addition to those planned under the current project scope, prior to full implementation.

Since this Alternative requires use of the CRU1 DEEP truck, scheduling of the use of the truck to meet CRU1's requirements and the UNH project, must be addressed. CRU1 has indicated that the vehicle is needed for the months of June and July 1995. Therefore, use of the existing or new FERMC0 Remediation Support Operations Supersucker™, which has a 3,000 gallon tank, may be necessary. The smaller capacity tank would further impact a neutralization operation schedule. However, since the schedule indicates that UNH will not occur during this period, no further evaluation of this possibility is being pursued.

Also, the CRU1 DEEP tanker truck, as currently specified, will not fully accommodate the UNH project requirements. Unlike the Supersucker™ trucks which handle high solids streams and slurries, the DEEP truck, as currently specified and procured employs a centrifugal pump which is not typically designed to pump slurries.

Therefore, it is assumed that transfer pump skids J-101 and J-104 would be needed for UNH transfer and J-102 or J-103 for MDU transfer. Existing double-diaphragm pumps at Plant 8 would be used to unload the slurry. Also, the truck storage compartment is not sloped which would make slurry removal more difficult. Negotiations are proceeding on possibly modifying the tank configuration prior to its construction.

4.3.3 Cost Estimate

The total value estimated for Alternative 2 is \$419,000 (see ATTACHMENT 3). This estimate assumes four concrete secondary containment vehicle pads and ancillary piping located at:

NFS Area
OK Liquor Area
Hot Raffinate Area
Plant 2/3

An epoxy coated secondary containment vehicle pad with dimensions roughly 45' x 15' to house a 37' long by 8' wide truck (based on the 5,000 gallon DEEP truck) would be constructed at the above four areas. Secondary containment curbing to contain 5,000 gallons of potential spillage and 5-inches of precipitation is 15-inches high, minimum.

Additionally, 50 feet of stainless steel (or hose where applicable) piping is estimated to be installed from each secondary containment pad to the location of either of the two transfer pumps J-101 or J-105.

Both NFS and OK Liquor Areas will require new secondary containment vehicle pads as stated above. The Hot Raffinate Building will require a secondary containment vehicle pad located near the existing south roll-up door.

At Plant 2/3, the west roll-up door into the Digestion Area could be taken advantage also. However, an existing curb and pump skid J-106 would need to be relocated. Additionally, the location of the magnesium hydroxide tanker truck is also proposed to be in this area. Therefore, a new pad is proposed just outside the roll-up door with new piping extending to UNH piping at Tank D1-1.

4.3.4 Schedule

The preliminary schedule for Alternative 2 indicates that the design and construction of the concrete secondary containment vehicle pads is critical path.

The schedule (see ATTACHMENT 4) assumes a start date for the Alternative of February 27, 1995. This provides a minimum period for DOE and EPA discussion and concurrence. The resulting early start to commence operations is projected as August 11, 1995.

NOTE: If Alternative 2 is selected as the preferred alternative, critical activities must be initiated. These critical activities have been identified in the attached schedule. In particular the following areas will require immediate attention:

- Review of any new designs and operations against the existing Safety Analysis Report (known as the Unresolved Safety Question)
- Construction of new systems
- Revision of the Standard Operating Procedures, lesson plans, training and simulation, system operability testing, and the FERMCO and DOE Operational Readiness Review (ORR).

TABLE 1

APPROXIMATE NUMBER OF TRUCK TRANSFERS

I. UNH FROM NINE (9) UNH SATELLITE TANKS (UNH Transferred into F1-25 or F1-26 by Truck)

LOCATION	UNH INVENTORY (GALLONS)	UNH TRUCK TRANSFERS NOM. 5K GAL. TRUCK (@ 4K GAL./LOAD)	MgO (GAL.)	MDU SLURRY TRUCK TRANSFERS, NOM. 3K GAL. TRUCK (@ 2.5K GAL./LOAD)
NFS:				
F2-605	23,463	6	2,652	11
F2-606	23,427	6	2,086	11
F2-607	22,726	6	2,682	11
F2-608	19,996	5	2,608	9
OK LIQUOR:				
F3E-223	9,231	3	1,262	5
HOT RAFFINATE:				
F1-301	1,990	1	166	1
F1-302	2,309	1	104	1
F1-303	2,104	1	192	1
F1-308	1,894	1	268	1
TOTAL (I)		UNH (I)=30		MDU (I)=51

TABLE 1
(Continued)

II. UNH FROM NINE (9) UNH TANKS IN COMBINED SECONDARY CONTAINMENT (UNH Transferred to F1-25 or F1-26 by Pipeline)

LOCATION	UNH INVENTORY (GALLONS)	MgO (GALLONS)	MDU SLURRY TRUCK TRANSFERS NOM. 3K GAL. TRUCK (@ 2.5K GAL./LOAD)
CD BLEND:			
NE	21,423	2,943	10
SE	23,645	2,346	11
SW	21,740	2,643	10
PLANT 2/3:			
F1-1	1,825	305	1
F1-2	1,454	262	1
F1-25	12,875	1,932	6
D1-1	3,150	914	2
D1-10	5,148	895	3
F3E-220	2,036	334	1
TOTAL (II)			MDU (II)=45

III. TOTAL TRUCK TRANSFERS:

UNH (I) = 30
MDU (I) = 51
MDU (II) = 45
TOTAL 126

6591

ATTACHMENT 3

ALTERNATIVE 2 - TRUCK TRANSFER
COST ESTIMATE

000068

**FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES**

23 JANUARY 95

BASIS OF ESTIMATE

PROJECT DESCRIPTION:	UNH - TANKER TRUCK PADS
WBS NUMBER:	1.1.1.
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	RON WORSELY
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	IH950201

SUPPORTING DOCUMENTATION:

Verbal Scope	<input checked="" type="checkbox"/>	P & ID's	<input type="checkbox"/>	Work Plan	<input type="checkbox"/>
Drawings	<input type="checkbox"/>	Equipment List	<input type="checkbox"/>	Site Walk	<input type="checkbox"/>
Sketch	<input checked="" type="checkbox"/>	Specifications	<input type="checkbox"/>	Eng Mtg	<input type="checkbox"/>
Flow	<input type="checkbox"/>	Site H & S	<input type="checkbox"/>	Price	<input type="checkbox"/>
Diagrams	<input type="checkbox"/>	Plan	<input type="checkbox"/>	Quotes	<input type="checkbox"/>

TYPE OF ESTIMATE:

Plan/Feasbl	<input checked="" type="checkbox"/>	Budg/Concpt	<input type="checkbox"/>	Title I Des	<input type="checkbox"/>
Title II Des	<input type="checkbox"/>	Government	<input type="checkbox"/>	Independent	<input type="checkbox"/>
Construction	<input type="checkbox"/>	Baseline	<input type="checkbox"/>		

BASIS OF ESTIMATE:

This Basis of Estimate represents the scope of work to construct four (4) concrete pads with curbs for containment at locations to accommodate processing the UNH. The size of the pad containment will accommodate a 5,000 gal spill plus 5" depth for rainfall. It is assumed that any spill will be pumped out using portable equipment and is not part of this scope. A gravel ramp to the pad is included. Also fifty (50) LF of piping is provided for each location as well as hose connectors.

It is assumed that the work will be done wearing modified 'D' PPE's.

**FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES**

23 JANUARY 95

ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	UNH - TANKER TRUCK PADS
WBS NUMBER:	1.1.1.
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	RON WORSLEY
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	IH950201

EXECUTION:

These projects are estimated to be performed by Wise working a 40-hour week, 10 hours a day, no overtime or holidays. An assumed construction start and finish dates are indicated in Appendix D (Construction Activity Duration) for each alternative.

WAGE RATES:

Wage rates within the estimates are based on the current rates furnished by the local Craft Labor Board. All Labor Dollars are considered constant 1995 dollars.

ENGINEERING:

Engineering costs were provided by Engineering.

PRODUCTIVITY:

A site specific factor of 1.27 has been applied to Net Chart manhours. See Appendices A and B for development and application.
Task-specific factors were applied as necessary when identified.
PPE-specific factors were applied based on level identified. See Appendix B.
An allowance for delays caused by monitoring and radiation checking is included. See Appendix C, Health Physics.
No exposure/burnout rates have been identified for this work.

ESCALATION:

Escalation has been excluded from these estimates. Costs are considered to be constant 1995 dollars.

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**FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES**

23 JANUARY 95

ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION: UNH - TANKER TRUCK PADS
WBS NUMBER: 1.1.1.
PROJECT LOCATION: FERNALD, OHIO
PROJECT ENGINEER: RON WORSLEY
ESTIMATOR: KEN KEPLER
ESTIMATE NUMBER: IH950201

UNIT RATES:

In general, the unit manhours, subcontract dollars, equipment dollars, and material dollars were based on 1993 MEANS. In most cases, a site productivity factor of 1.27 was applied to the Net chart unit manhours. The unit material and subcontract dollars were escalated 6% to arrive at 1995 constant dollars.

QUANTITIES:

Quantities are based on the sketch and scope of work provided by engineering.

HEALTH PHYSICS: (See Appendix C)

All workers at the site will participate in the Medical Monitoring & Surveillance Program, the Random Drug Testing Program and the FEMP Radiation In-Vivo & Bioassay Testing Program. Costs are for the workers' time to participate in these programs based on the Number of Workers and the Duration of Construction Activity information.

Material dollars are included in this section to provide PPE's for the worker when required. Disposable PPE's are to be provided by the subcontractor. Washable PPE's will be provided by the subcontractor for the initial changeout for each required worker, with subsequent changeouts and cost for washing and decontamination provided by FERMCO. Labor dollars are included in this section for work delays caused by monitoring and rad checking.

NUMBER OF WORKERS:

Calculation: Total Direct Manhours Div. By 1813 Hours (1 Man Year) x 1.25 (attrition) Div. By the Duration of Construction in Months x 12 = number of workers per year.

(Use number of workers per year to determine CERCLA/SAT and Health Physics costs.)

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**FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES**

23 JANUARY 95

ESTIMATE ASSUMPTIONS

PROJECT DESCRIPTION:	UNH - TANKER TRUCK PADS
WBS NUMBER:	1.1.1.
PROJECT LOCATION:	FERNALD, OHIO
PROJECT ENGINEER:	RON WORSLEY
ESTIMATOR:	KEN KEPLER
ESTIMATE NUMBER:	IH950201

G&A (Home Office Expense):

G&A are excluded from the target estimate. The G&A costs are calculated within the Micro-Frame computer system according to the plan for rebaselining.

RISK BUDGET:

A cost element, based on a risk analysis calculated for this estimate to cover a statistical probability of a 50% chance of overrun/underrun to the project. The target estimate is the sum of the base estimate and the risk budget. The target estimate is the basis for the Performance Baseline. The risk budget for these projects will vary according to the results of the analysis. See the Risk Analysis at the end of each estimated alternative and refer to the Estimate Summary Sheets.

CONTINGENCY:

An amount budgeted to cover costs that may result from incomplete design, unforeseen and unpredictable conditions, or uncertainties. The amount of the contingency will depend on the status of design, procurement, construction, and the complexity and uncertainties of the component parts of the project. Contingency is not to be used to avoid making an accurate assessment of expected costs.

Contingency is calculated as the delta between the 50% chance of overrun and the 5% chance of overrun, indicated on the risk analysis. Contingency for these alternatives will vary based on the results of the risk analysis. See the risk analysis at the end of each estimated alternative and refer to the Estimate Summary Sheets.

**FERMCO
PROJECT & CONFIGURATION CONTROL
ESTIMATING SERVICES**

23 JANUARY 95

SCOPE OF WORK

PROJECT DESCRIPTION: UNH - TANKER TRUCK PADS
WBS NUMBER: 1.1.1.
PROJECT LOCATION: FERNALD, OHIO
PROJECT ENGINEER: RON WORSLEY
ESTIMATOR: KEN KEPLER
ESTIMATE NUMBER: IH950201

INCLUSIONS:

See the Detailed Estimate Worksheets.

Costs have been included in the Indirect Field Costs for:

- Wise supervision
- FERMCO Construction Mgmt.
- FERMCO Project Mgmt.
- Small tools and consumables
- Equipment rental
- Job clean-up
- Safety
- Health Physics

Costs have been included as FERMCO Field Support Costs for:

- C o n s t r u c t i o n M a n a g e m e n t

Costs are included for Engineering support.

Costs have been included for Ohio State sales tax

- at 6%

Costs have been included for Risk Budget.

Costs have been included for Contingency.

EXCLUSIONS:

- Permits and fees
- Landlord costs
- Escalation
- G&A (home office expense)

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EST FILE #: IH950201

CLIENT: US DOE

PROJECT TITLE: UNH - TANKER TRUCK PADS

WBS#: 1.1.1.



SUMMARY SHEET

DATE: 06-Feb-95

ESTIMATOR: KEN KEPLER

LOCATION: FERNALD
TASK#: 38PE1

6591

CODE	ITEM DESCRIPTION	M/H	AVG. RATE	LABOR \$	S/C \$ / OTHERS	MAT'L \$	TOTAL \$
DIRECT FIELD COSTS							
1	HOT RAFFINATE PAD	1,065	\$30.78	\$33,700		\$11,500	\$45,200
2	NFS PAD	1,065	\$30.78	\$33,700		\$11,500	\$45,200
3	LIQUOR PAD	1,065	\$30.78	\$33,700		\$11,500	\$45,200
4	WEST DOOR - PLANT 2/3 PAD	1,065	\$30.78	\$33,700		\$11,500	\$45,200
NOTE:							
* Included in WISE Labor Rate.							
AVG							
DIRECT FIELD COSTS		4,380	\$30.78	\$134,800		\$48,000	\$180,800
1	SUPERVISION - CONTRACTOR (WISE)	219	\$23.75	\$5,200			\$5,200
2	SM TOOLS/CONSM'BLS					\$8,100	\$8,100
3	EQUIPMENT RENTAL					\$11,800	\$11,800
4	TEMP. FACILITIES N/A						
5	TEMP UTL'S HOOK-UP N/A						
6	JOB CLEAN-UP			\$2,800		\$5,300	\$8,100
7	SAFETY			\$1,400		\$2,800	\$4,000
8	HEALTH PHYSICS S/C			\$22,400		\$26,200	\$48,600
9	CERCLA/SAT \$1,500 PER PERSON *						
0	BOND *						
1	OVERHEAD & PROFIT *						
2	PAYRL BRD.&BENFT. *						
INDIRECT FIELD COSTS				\$31,800		\$53,800	\$85,600
DIRECT & INDIRECT FIELD COSTS				\$166,600		\$98,800	\$268,400
3	PURCHASE WASTE CONTAINERS (RSO)						
4	CERTIFICATION & TRANSPORTATION (RSO)						
7	BURIAL FEES (RSO)						
6	PROJ.MGMT - FERMCO N/A						
7	CONSTR MGMT - FERMCO	380	\$36.84	\$55,400			\$55,400
FERMCO FIELD SUPPORT COSTS				\$55,400			\$55,400
8	EMISSION MODELING N/A						
9	PSAR/FSAR(SAFETY RPT) N/A						
0	ENGINEERING TITLE I&II \$16,000 TITLE III		\$5,300				\$21,300
ENGINEERING COSTS							\$21,300
1	SALES TAX 6.0%					\$99,800	\$99,800
SUB-TOTAL (BASE ESTIMATE)							\$348,100
2	G&A-FERMCO (SEE EXCLUSION COMMENTS)						
3	ESCALATION (SEE EXCLUSION COMMENTS)						
4	RISK BUDGET 15.0%						\$52,400
TARGET ESTIMATE (BASE ESTIMATE PLUS RISK BUDGET)							\$401,500
5	CONTINGENCY 5.0%						\$17,500
TOTAL ESTIMATE (TARGET ESTIMATE PLUS CONTINGENCY)							\$419,000
F:\LOTUS31\UNHPAD\ND\SUM.WK3							

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APPENDIX A

PROJECT - UNH - TANKER TRUCK PADS
 PROJ. LOCATION: FERNALD PLANT
 ESTIMATOR: KEN KEPLER

SITE SPECIFIC
 EFFICIENCY / MULTIPLIER ANALYSIS

WBS NO. : 1.1.1.
 TASK I.D. : 38PE1

EST. NO. : IH950201
 DATE : 06-Feb-95

	PERCENT OF INFLUENCE ON CHART MANHOURS						CHART MANHOURS			% OF INFLUENCE	WT'D VALUE	PROD. RESULT
	40%	50%	60%	70%	80%	90%	100%	105%				
CRAFT SKILL (NOTE 1)	POOR			FAIR			STD	V.GOOD	EXCELLENT	80.00%	12.0%	9.60%
CRAFT AVAIL (NOTE 1)		POOR		FAIR			STD			80.00%	8.0%	6.40%
CLIMATE (NOTE 2)	SEVERE	ICE/SNOW			RAIN		+40 TO +85			70.00%	20.0%	14.00%
PLANT ELEVATION		OVER 10,000FT			5,000' TO 10,000 FT		UNDER 5,000 FT			100.00%	5.0%	5.00%
WORK SPACE	<----- MULTIPLE SHIFTS-----			200 SF	250 SF	300 SF	350 SF			70.00%	10.0%	7.00%
WORK WEEK							4-10s / 5-8s			100.00%	15.0%	15.00%
50 HOUR WORK WEEK	////////////////////			OVER 7 WEEKS	3 TO 7 WEEKS	UP TO 3 WEEKS						
60 HOUR WORK WEEK	////////////////////			OVER 7 WEEKS	3 TO 7 WEEKS	UP TO 3 WEEKS						
SHIFTWORK												
2ND SHIFT					2ND SHIFT		ONE SHIFT ONLY			100.00%	3.0%	3.00%
3RD SHIFT			3RD SHIFT							100.00%	5.0%	5.00%
PROJECT SIZE					400M MH AND UP	300M TO 400M MH	200M TO 300M MH	200M MH OR LESS		105.00%	4.0%	4.20%
PLANT TYPE				REVAMP ONLY	REVAMP & NEW	NEW IN EXIST PLT	GRASS ROOTS			70.00%	8.0%	5.60%
AREA/UNION INFLUENCE	STRONG		MILD		SOME		NONE			40.00%	10.0%	4.00%
NOTES.....												
1. TURNOVER HAS BEEN CONSIDERED												100.0%
2. FOR EXTERIOR WORK ONLY												78.8%
EFFICIENCY (AS A % OFF CHART MANHOURS)												78.8%
MULTIPLIER - (TO BE APPLIED TO CHART M.H.'S TO OBTAIN SITE M.H.'S)												1.27

APPENDIX B

EFFICIENCY FACTORS

CONTRACT NO. : 4424321
 PROJECT DESC. : UNH - TANKER TRUCK PADS
 PROJECT CONTROLS : RSO
 PROJ. LOCATION : FERNALD
 PROJ. ENGINEER : LEO SINGLETON
 ESTIMATOR : KEN KEPLER
 ESTIMATE NO. : IH950201
 WBS NO. : 1.1.1.
 TASK I.D. : 3BPE1

EXAMPLE:

STANDARD CHART MANHOURS = NET 100
EFFICIENCY FACTORS:
 *SITE SPECIFIC (SEE APPENDIX A) 27% 27
 S/T = BASE UNIT MANHOURS 127

*TASK SPECIFIC (BASED ON LABOR CHARTS OR EST. KNOWLEDGE)

SEE DETAIL SHEETS or M.H. CHARTS 0% 0 N/A
 S/T = NEW BASE UNIT MANHOURS 127

*PPE SPECIFIC (BASED ON CURRENT DATA & EST. KNOWLEDGE)

	LEVEL	D	Mod. 'D'	C	B			
PRODUCTIVITY HOURS (AS ADDER TO BASE MH's)	0	0	1.1	140	1.5	191	1.75	222
TOTAL HOURS WITH PRODUCTIVITY		127	2.1	267	2.5	318	2.75	349

NOTE : Use a Default Productivity Factor of 2.1 for working in a contaminated area if Safety Level cannot be determined.

(SEE FERMCO ESTIMATING SERVICES REFERENCE MANUAL IM-6006 8.10)

Total hours with productivity divided by 10 hour working days = (PPE) ManDays to determine material cost of PPE's.
 (SEE APPENDIX C -HEALTH PHYSICS)

27 MD

32 MD

35 MD

THESE EFFICIENCY FACTORS WERE APPLIED INDIVIDUALLY THROUGHOUT THE ESTIMATE AT A TASK SPECIFIC LEVEL TO OBTAIN A MORE ACCURATE ACCOUNT OF OVERALL EFFICIENCY IMPACT DUE TO PPE REQUIREMENTS IN HANDLING CONTAMINATED AND HAZARDOUS WASTE.

PROJECT TITLE:
UNH - TANKER TRUCK PADS
WBS#:
1.1.1.

HEALTH PHYSICS

DATE: 06-Feb-95

EST.NO.: IH950201
EST.: KEN KEPLER
TASK I.D.: 3BPE1

PPE'S - PERSONAL PROTECTIVE EQUIPMENT

DESCRIPTION	UNIT	UNIT COST \$'s	* NO. OF CHANGE OUTS PER WORKER PER DAY					
			MD : MAN DAYS (TOTAL HOURS DIV. 10 HR. DAYS)					
			*	MD	MAT'L.\$'s	LEVEL		
FULL/HALF FACE MASK w/RESPIRATOR & CARTRIDGES								
TYVEK SUIT – DISPOSABLE	EA	3.20	4	0	\$0	C/B		
TYVEK HOOD – DISPOSABLE	EA	6.00	4	0	\$0	C/B		
TYVEK BOOT COVER – DISPOSABLE	EA	1.30	4	0	\$0	C/B		
GLOVE LINER – DISPOSABLE	PR	1.40	4	0	\$0	C/B		
GLOVE, LASTEX – DISPOSABLE	PR	1.50	4	0	\$0	C/B		
GLOVE, WORK – DISPOSABLE	PR	0.90	4	0	\$0	C/B		
APR CARTRIDGES – DISPOSABLE	PR	17.50	4	0	\$0	C/B		
SUB-TOTAL		31.80	4		\$0			
					ERR	UNIT COST PER MAN DAY		
FULL DRESS w/ FACE SHIELD						Modified		
TYVEK SUIT – DISPOSABLE	EA	3.20	4	398	\$5,090	D		
TYVEK HOOD – DISPOSABLE	EA	6.00	4	398	\$9,550	D		
TYVEK BOOT COVER – DISPOSABLE	EA	1.30	4	398	\$2,070	D		
GLOVE LINER – DISPOSABLE	PR	1.40	4	398	\$2,230	D		
GLOVE, LASTEX – DISPOSABLE	PR	1.50	4	398	\$2,390	D		
GLOVE, WORK – DISPOSABLE	PR	0.90	4	398	\$1,430	D		
SUB-TOTAL		14.30	4		\$22,760			
					\$57.20	UNIT COST PER MAN DAY		
OTHER EQUIPMENT			WKR					
RUBBER BOOT COVERS – (1) PR. PER WORKER	PR	12.70	7		\$90	D/C/B		
APR w/HALF FACE MASK – (1) PER WORKER	EA	22.30	7		\$160	C		
APR w/FULL FACE MASK – (1) PER WORKER	EA	174.00	7		\$1,220	C		
SCBA	EA	1894.00	1		\$1,890	B		
COOL VESTS	EA	137.50	0		\$0	C/B		
THERMO STRIPS	EA	50.00	0		\$0	C/B		
SUB-TOTAL					\$3,400			
TOTAL PPE's (FORWARD TO PAGE 2 OF 2)					\$26,200			

OTHER PPE's SUCH AS HARD HAT, SAFETY GLASSES/GOGGLES, STEEL TOED SAFETY SHOES, HEARING PROTECTION, ARE CONSIDERED THE SUBCONTRACTORS RESPONSIBILITY AND ARE COVERED IN HIS OVERHEAD EXPENSE. COSTS OF FERMCO SUPPLIED PPE's, SUCH AS COTTON COVERALLS, EXCHANGE OF RUBBER BOOT COVERS AND RESPIRATORS FOR CHANGEOUTS AND CLEANING OF SAME IS INCURRED BY FERMCO AND COSTS ARE NOT INCLUDED AS PART OF PROJECT COSTS AT THIS TIME.

PROJECT TITLE:
UNH - TANKER TRUCK PADS
WBS#:
1.1.1.

HEALTH PHYSICS

DATE: 06-Feb-95

EST.NO.: IH950201
EST.: KEN KEPLER
TASK I.D.: 3BPE1

MEDICAL MONITORING - IN-VIVO & BIOASSAY SURVEILLANCE

MEDICAL MONITORING & SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR \$		
BASLINE PHYSICALS	1	4	18	72	\$30.78	\$2,220		
ANNUAL PHYSICALS	0	3	18	0	\$30.78	\$0		
EXIT (TERMINATION) PHYSICALS	1	4	18	72	\$30.78	\$2,220		
SUB-TOTAL						\$4,440		

FEMP RADIATION IN-VIVO & BIOASSAY SURVEILLANCE - LOST WORKER TIME

DESC.	QTY	HRS	WKR	TOTAL HOURS	AVG. LABOR RATE	TOTAL LABOR \$		
MONTHLY BIOASSAY	2	1	18	36	\$30.78	\$1,090		
YEARLY IN-VIVO	0	4	18	0	\$30.78	\$0		
EXIT (END OF PROJECT / TERMINATION)	1	4	18	72	\$30.78	\$2,220		
SUB-TOTAL						\$3,310		

	WKRS	TESTS	HRS					
RANDOM DRUG TESTING	18	3	2	6	\$30.78	\$200		
	NO. OF WKRS. TESTED	TESTING DAYS PER YR.	AVG. NO. OF TESTS PER DAY	CHANCE PER DAY FOR TEST	NO. OF WKRS. FOR THIS ESTIMATE	CHANCES PER DAY FOR TEST FOR PROJECT	CONSTRUCTION WORKING DAYS	
	4000	226	18	0.0045	18	0.081	38	

WORK DELAYS CAUSED BY MONITORING	5%				\$144,200	\$7,210		
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WORK DELAYS CAUSED BY RAD CHECKING	5%				\$144,200	\$7,210		
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	TOTAL LABOR \$'s	TOTAL MAT'L \$'s	TOTAL DOLLARS
TOTAL HEALTH PHYSICS - FORWARD TO ESTIMATE SUMMARY SHEET	\$22,400	\$26,200	\$48,600

F:\LOTUS31\UNHPAD\HLTHPHYS.WK3

CONSTRUCTION ACTIVITY

DURATION

CONT.NO. - 4424321
 PROJECT - UNH - TANKER TRUCK PADS
 CONTROLS -
 LOCATION - FERNALD
 TASK I.D. - 3BPE1

WBS NO. - 1.1.1.
 EST. NO. - IH950201
 BY - K. KEPLER
 DATE - 02/06/95

ACTIVITY	EST. DATE	START DATE	MID POINT	COMPL. DATE	CONSTRUCTION ACTIVITY DURATION
CONSTRUCTION	06-Feb-95	01-Jun-95	01-Jul-95	31-Jul-95	2.0 MONTHS

EST. DATE TO MID-POINT OF ACTIVITY	
4.8	MONTHS

CONSTRUCTION ACTIVITY DURATION IS USED IN DETERMINING NO. OF WORKERS FOR CERCLA/SAT
 AND HEALTH PHYSICS COSTS.

BUDGET ESTIMATE DETAILS

[illegible]

PAGE 1 of 5.

CONTR.NO. - 4424321
CLIENT - U.S. DEPT. OF ENERGY
PROJECT - UNH - TANKER TRUCK PADS
LOCATION - FERNALD, OHIO
PROJ.CTL - TOM CRAWFORD

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
EST. NO. IH-95-02-1
BY: KEN KEPLER
DATE: 02/06/95
TASK #: 3BPE1

COST CATEG.	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR WISE	SUB	MAT'L				
	<u>HOT RAFFINATE PAD</u>												
mD	Pad												
mD	Excavate, Load	25	CY	0.06	2	26.99		1.35	\$100	\$30			\$130
mD	Haul	25	CY	0.06	2	26.99		1.57	\$100	\$40			\$140
mD	Subgrade for Pad – gravel, geotextile	75	SY	0.03	3	26.99		0.86	\$100	\$60	\$1,180		\$1,340
mD	Subgrade for Ramp – gravel	75	SY	0.016	2	26.99		0.37	\$100	\$30	\$500		\$630
mD	Concrete Pad – Reinforced Type24	25	CY	5.80	184	28.06		18.00	\$5,200	\$450	\$3,190		\$8,840
mD	Concrete Curb – Type31	5.2	CY	15.30	101	28.06		15.60	\$2,800	\$80	\$1,530		\$4,410
mD	Epoxy Coat Seal – Spray 1/8" thk.	920	SF	0.024	28	31.79		0.24	\$900	\$220	\$1,040		\$2,160
mD	Piping – 316LSS, sch40 BW – 3" Dia.	50	LF	2.00	127	35.22		6.00	\$4,500	\$300	\$2,580		\$7,380
mD	Insulation – Cal-Sil.w/Alum.Jkt. – 3" x 1-1/2" thk.	50	LF	0.35	22	31.79		1.05	\$700	\$50	\$260		\$1,010
mD	Hose Connections	1	LS	2.00	3	35.22			\$100		\$210		\$310
	<u>PPE ALLOWANCES</u>												
mD		474	HRS	110%	521	AVG				\$16,000			\$16,000
mD		1260	EQP	110%							\$1,390		\$1,390
		100	MD										
	SUB-TOTAL (HOT RAFFINATE PAD)	1	LOT		995	30.75				\$30,600	\$2,850	\$10,490	\$43,740
	MTO ALLOWANCE 10%	1	LOT		100					\$3,060	\$285	\$1,049	\$4,374
	TOTAL (HOT RAFFINATE PAD)	1	LOT		1,095	30.78				\$33,700	\$2,900	\$11,500	\$48,100

mD = modified level 'D' PPE and Anti-C

Hot Raffinate Pad – Details

PAGE 2 of 5

CONTR.NO. - 4424321
 CLIENT - U.S. DEPT. OF ENERGY
 PROJECT - UNH - TANKER TRUCK PADS
 LOCATION - FERNALD, OHIO
 PROJ.CTL - TOM CRAWFORD

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
 EST. NO. IH-95-02-1
 BY: KEN KEPLER
 DATE: 02/06/95
 TASK #: 3BPE1

COST CATEG.	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>NFS PAD</u>						WISE						
mD	Pad	25	CY	0.06	2	26.99		1.35		\$100	\$30		\$130
mD	Excavate, Load	25	CY	0.06	2	26.99		1.57		\$100	\$40		\$140
mD	Haul												
mD	Subgrade for Pad - gravel, geotextile	75	SY	0.03	3	26.99		0.86	15.27	\$100	\$60	\$1,180	\$1,340
mD	Subgrade for Ramp - gravel	75	SY	0.016	2	26.99		0.37	6.50	\$100	\$30	\$500	\$630
mD	Concrete Pad - Reinforced Type24	25	CY	5.80	184	28.06		18.00	124.00	\$5,200	\$450	\$3,190	\$8,840
mD	Concrete Curb - Type31	5.2	CY	15.30	101	28.06		15.60	285.00	\$2,800	\$80	\$1,530	\$4,410
mD	Epoxy Coat Seal - Spray 1/8" thk.	920	SF	0.024	28	31.79		0.24	1.10	\$900	\$220	\$1,040	\$2,160
mD	Piping - 316LSS, sch40 BW	50	LF	2.00	127	35.22		6.00	50.00	\$4,500	\$300	\$2,580	\$7,380
mD	Insulation - Cal-Sil.w/Alum.Jkt. - 3" x 1-1/2" thk.	50	LF	0.35	22	31.79		1.05	5.00	\$700	\$50	\$260	\$1,010
mD	Hose Connections	1	LS	2.00	3	35.22			200.00	\$100		\$210	\$310
	<u>PPE ALLOWANCES</u>												
mD		474	HRS	110%	521	AVG				\$16,000			\$16,000
mD		1260	EQP\$	110%							\$1,390		\$1,390
mD		100	MD										
	SUB-TOTAL (NFS PAD)	1	LOT		995	30.75				\$30,600	\$2,650	\$10,490	\$43,740
	MTO ALLOWANCE 10%	1	LOT		100					\$3,060	\$265	\$1,049	\$4,374
	TOTAL (NFS PAD)	1	LOT		1,095	30.78				\$33,700	\$2,900	\$11,500	\$48,100

NFS Pad - Details

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CONTR.NO. - 4424321
 CLIENT - U.S. DEPT. OF ENERGY
 PROJECT - UNH - TANKER TRUCK PADS
 LOCATION - FERNALD, OHIO
 PROJ.CTL - TOM CRAWFORD

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
 EST. NO. IH-95-02-1
 BY: KEN KEPLER
 DATE: 02/06/95
 TASK #: 3BPE1

COST CATEG.	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR WISE	SUB	MAT'L				
	<u>LIQUOR PAD</u>												
mD	Pad												
mD	Excavate, Load	25	CY	0.06	2	26.99		1.35		\$100	\$30		\$130
mD	Haul	25	CY	0.06	2	26.99		1.57		\$100	\$40		\$140
mD	Subgrade for Pad - gravel, geotextile	75	SY	0.03	3	26.99		0.86	15.27	\$100	\$60	\$1,180	\$1,340
mD	Subgrade for Ramp - gravel	75	SY	0.016	2	26.99		0.37	6.50	\$100	\$30	\$500	\$630
mD	Concrete Pad - Reinforced Type24	25	CY	5.80	184	28.06		18.00	124.00	\$5,200	\$450	\$3,190	\$8,840
mD	Concrete Curb - Type31	5.2	CY	15.30	101	28.06		15.60	285.00	\$2,800	\$80	\$1,530	\$4,410
mD	Epoxy Coat Seal - Spray 1/8" thk.	920	SF	0.024	28	31.79		0.24	1.10	\$900	\$220	\$1,040	\$2,160
mD	Piping - 316LSS, sch40 BW	50	LF	2.00	127	35.22		6.00	50.00	\$4,500	\$300	\$2,580	\$7,380
mD	Insulation - Cal-Sil.w/Alum.Jkt. - 3" x 1-1/2" thk.	50	LF	0.35	22	31.79		1.05	5.00	\$700	\$50	\$260	\$1,010
mD	Hose Connections	1	LS	2.00	3	35.22			200.00	\$100		\$210	\$310
	<u>PPE ALLOWANCES</u>												
mD		474	HRS	110%	521	AVG 30.80				\$16,000			\$16,000
mD		1260	EQP\$	110%							\$1,390		\$1,390
		100	MD										
	SUB-TOTAL (LIQUOR PAD)	1	LOT		995	30.75				\$30,600	\$2,650	\$10,490	\$43,740
	MTO ALLOWANCE 10%	1	LOT		100					\$3,060	\$265	\$1,049	\$4,374
	TOTAL (LIQUOR PAD)	1	LOT		1,095	30.78				\$33,700	\$2,900	\$11,500	\$48,100

Liquor Pad - Details

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CONTR.NO. - 4424321
 CLIENT - U.S. DEPT. OF ENERGY
 PROJECT - UNH - TANKER TRUCK PADS
 LOCATION - FERNALD, OHIO
 PROJ.CTL - TOM CRAWFORD

BUDGET ESTIMATE DETAILS

CONTR.NO. 4424321
 EST. NO. IH-95-02-1
 BY: KEN KEPLER
 DATE: 02/06/95
 TASK #: 3BPE1

COST CATEG.	DESCRIPTION	QUAN	UNIT	MANHOURS			COST/UNIT			LABOR	EQUIP	MATERIAL	TOTAL
				UNIT	TOTAL	RATE	LABOR	SUB	MAT'L				
	<u>WEST DOOR - PLANT 2/3 PAD</u>						WISE						
mD	Pad												
mD	Excavate, Load	25	CY	0.06	2	26.99		1.35		\$100	\$30		\$130
mD	Haul	25	CY	0.06	2	26.99		1.57		\$100	\$40		\$140
mD	Subgrade for Pad - gravel, geotextile	75	SY	0.03	3	26.99		0.86	15.27	\$100	\$60	\$1,180	\$1,340
mD	Subgrade for Ramp - gravel	75	SY	0.016	2	26.99		0.37	6.50	\$100	\$30	\$500	\$630
mD	Concrete Pad - Reinforced Type24	25	CY	5.80	184	28.06		18.00	124.00	\$5,200	\$450	\$3,190	\$8,840
mD	Concrete Curb - Type31	5.2	CY	15.30	101	28.06		15.60	285.00	\$2,800	\$80	\$1,530	\$4,410
mD	Epoxy Coat Seal - Spray 1/8" thk.	920	SF	0.024	28	31.79		0.24	1.10	\$900	\$220	\$1,040	\$2,160
mD	Piping - 316LSS, sch40 BW	50	LF	2.00	127	35.22		6.00	50.00	\$4,500	\$300	\$2,580	\$7,380
mD	Insulation - Cal-Sil.w/Alum.Jkt. - 3" x 1-1/2" thk.	50	LF	0.35	22	31.79		1.05	5.00	\$700	\$50	\$280	\$1,010
mD	Hose Connections	1	LS	2.00	3	35.22			200.00	\$100		\$210	\$310
	<u>PPE ALLOWANCES</u>												
mD		474	HRS	110%	521	AVG				\$16,000			\$16,000
mD		1260	EQP\$	110%							\$1,390		\$1,390
		100	MD										
	<u>SUB-TOTAL(WEST DOOR - PLANT 2/3 PAD)</u>	1	LOT		995	30.75				\$30,600	\$2,850	\$10,490	\$43,740
	<u>MTD ALLOWANCE 10%</u>	1	LOT		100					\$3,060	\$265	\$1,049	\$4,374
	<u>TOTAL(WEST DOOR - PLANT 2/3 PAD)</u>	1	LOT		1,095	30.78				\$33,700	\$2,900	\$11,500	\$48,100

West Door - Plant 2/3 Pad - Details

PAGE 5 of 5

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RISK BUDGET/OVERRUN ANALYSIS OUTPUT

PROJECT: UNH - TANKER TRUCK PADS

CLIENT: DOE

DATE: 06-Feb-95

CONTRACT: IH-95-02-01

BASE ESTIMATE: \$349,100

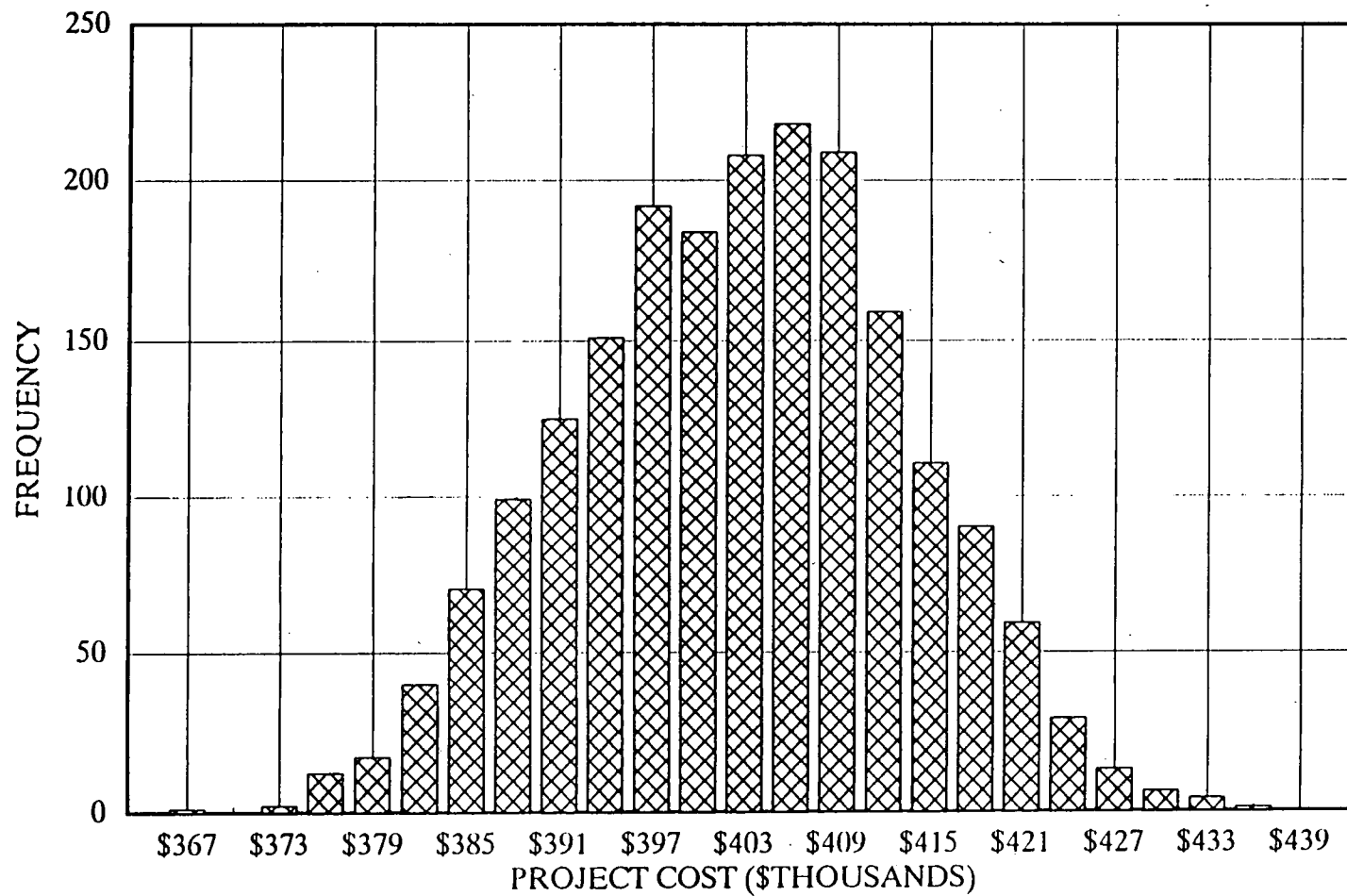
CHANCES OF OVERRUN	PROJECT COST W/RISK BUDGET	RISK BUDGET ADDED TO BASE ESTIMATE	%RISK BUDGET OF BASE ESTIMATE
0.00%	\$456,825	\$107,725	30.9%
0.05%	\$432,596	\$83,496	23.9%
5.00%	\$418,658	\$69,558	19.9%
10.00%	\$415,072	\$65,972	18.9%
15.00%	\$412,290	\$63,190	18.1%
20.00%	\$410,083	\$60,983	17.5%
25.00%	\$408,642	\$59,542	17.1%
30.00%	\$407,233	\$58,133	16.7%
35.00%	\$405,611	\$56,511	16.2%
40.00%	\$404,200	\$55,100	15.8%
45.00%	\$402,976	\$53,876	15.4%
50.00%	\$401,664	\$52,564	15.1%
55.00%	\$400,120	\$51,020	14.6%
60.00%	\$398,527	\$49,427	14.2%
65.00%	\$396,784	\$47,684	13.7%
70.00%	\$395,303	\$46,203	13.2%
75.00%	\$393,546	\$44,446	12.7%
80.00%	\$391,692	\$42,592	12.2%
85.00%	\$389,801	\$40,701	11.7%
90.00%	\$386,893	\$37,793	10.8%
95.00%	\$383,697	\$34,597	9.9%
99.95%	\$371,559	\$22,459	6.4%
100.00%	\$345,609	(\$3,491)	-1.0%

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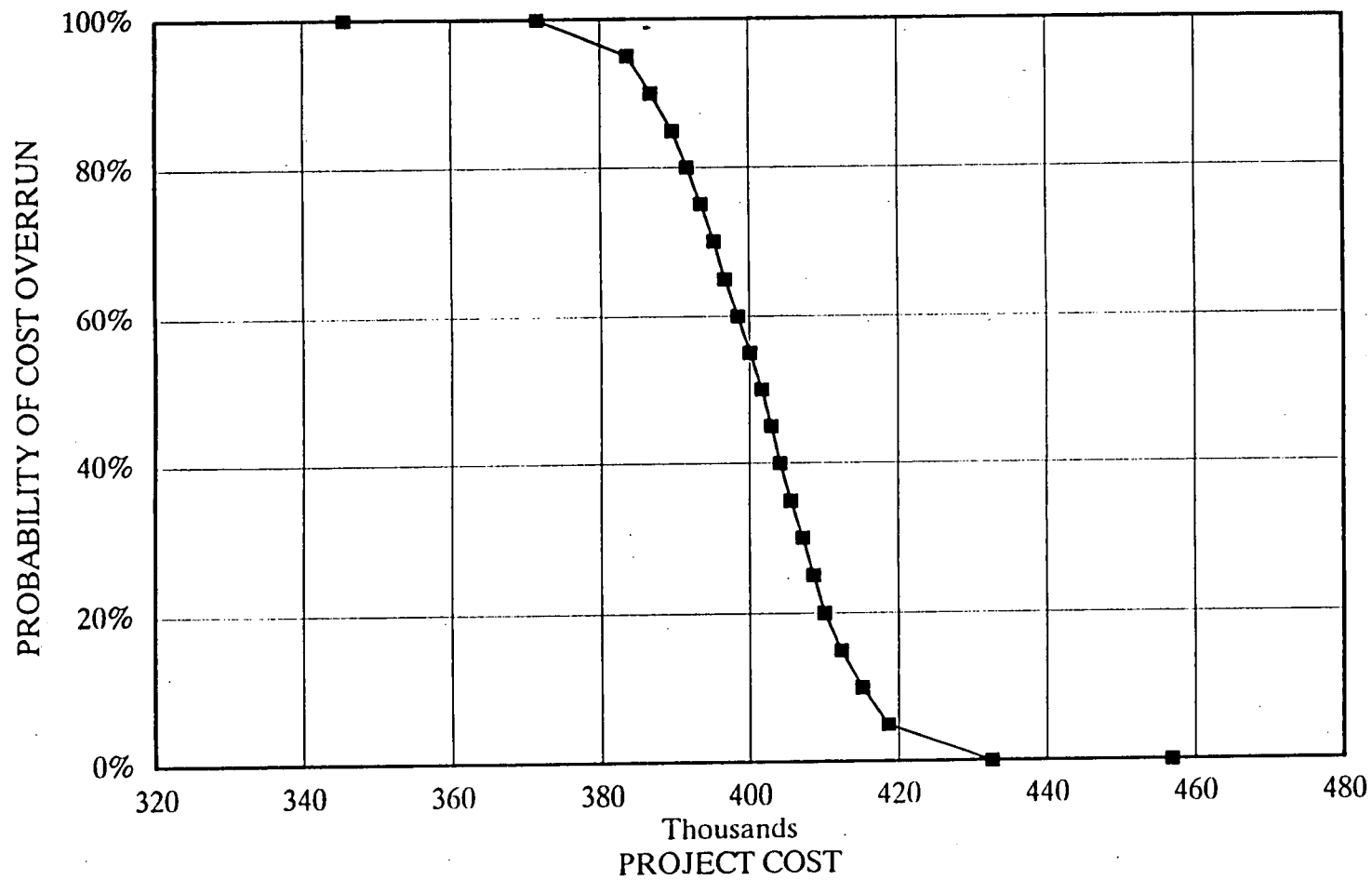
DISTRIBUTION OF 2,000 SAMPLES
UNH - TANKER TRUCK PADS



AVERAGE
\$401,160

6591

CUMULATIVE OVERRUN CURVE
UNH - TANKER TRUCK PADS



BASE ESTIMATE:
\$349,100

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**FERMCO RISK BUDGET ESTIMATING
INPUT DATA TABLE**

PROJECT: UNH - TANKER TRUCK PADS

CLIENT: DOE

CONTRACT: IH-95-02-01

ACCOUNT NO.	ITEM DESCRIPTION	ESTIMATE					DIST. TYPE	RELA- TIONS	RANGE FACTOR
		BASE\$	LOW%	LOWS	HIGH%	HIGHS			
1	HOT RAFFINATE PAD LABOR	33,700	-1%	\$33,363	40%	\$47,180	U		2%
2	HOT RAFFINATE PAD MAT'L	11,500	-1%	11,385	25%	14,375	U		4%
3	NFS PAD LABOR	33,700	-1%	33,363	40%	47,180	U		2%
4	NFS PAD MAT'L	11,500	-1%	11,385	25%	14,375	U		4%
5	LIQUOR PAD LABOR	33,700	-1%	33,363	40%	47,180	U		2%
6	LIQUOR PAD MAT'L	11,500	-1%	11,385	25%	14,375	U		4%
7	WEST DOOR PLANT 2/3 PAD LABOR	33,700	-1%	33,363	40%	47,180	U		2%
8	WEST DOOR PLANT 2/3 PAD MAT'L	11,500	-1%	11,385	25%	14,375	U		4%
9	INDIRECT FIELD COSTS LABOR	31,800	-1%	31,482	30%	41,340	U		3%
10	INDIRECT FIELD COSTS MAT'L	53,800	-1%	53,262	20%	64,560	U		5%
11	FERMCO CONST MGT LABOR	55,400	-1%	54,846	30%	72,020	U		3%
12	ENGINEERING	21,300	-1%	21,087	25%	26,625	U		4%
13	SALES TAX MAT'L	6,000	-1%	5,940	1%	6,060	U		50%
14				0		0			0%
15				0		0			0%
16				0		0			0%
17				0		0			0%
18				0		0			0%
19				0		0			0%
20				0		0			0%
21				0		0			0%
22				0		0			0%
23				0		0			0%
24				0		0			0%
25				0		0			0%
26				0		0			0%
27				0		0			0%
28				0		0			0%
29				0		0			0%
30				0		0			0%
31				0		0			0%
32				0		0			0%
33				0		0			0%
34				0		0			0%
35				0		0			0%
36				0		0			0%
37				0		0			0%
38				0		0			0%
39				0		0			0%
40				0		0			0%
41				0		0			0%
42				0		0			0%
43				0		0			0%
44				0		0			0%
45				0		0			0%
		\$349,100		\$345,609		\$456,825			

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REQUESTOR: TOM CRAWFORD -
 CLIENT: U.S. DEPARTMENT OF ENERGY
 PROJECT: UNH - TANKER TRUCK PADS
 LOCATION: FERNALD, OHIO
 WBS #: 1.1.1.

COST IMPACT MATRIX

EST. NO: IH950201
 DATE: 02/06/95
 BY: KEN KEPLER
 TASK #: 3BPE1

COST IMPACT MATRIX TOTAL	HOT RAFFINATE PAD		HOT RAFFINATE PAD		HOT RAFFINATE PAD		NFS PAD		NFS PAD		NFS PAD	
	LABOR \$'s		S/C \$'s		MAT'L \$'s		LABOR \$'s		S/C \$'s		MAT'L \$'s	
	BASE EST: \$33,700		BASE EST:		BASE EST: \$11,500		BASE EST: \$33,700		BASE EST:		BASE EST: \$11,500	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	40%					-1%	40%				
MATERIAL PRICING					-1%	25%					-1%	25%
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION (OTHER)												
TOTAL %	-1%	40%	0%	0%	-1%	25%	-1%	40%	0%	0%	-1%	25%
TOTAL \$	\$33,363	\$47,180	\$0	\$0	\$11,385	\$14,375	\$33,363	\$47,180	\$0	\$0	\$11,385	\$14,375

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

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RISK ANALYSIS

REQUESTOR: TOM CRAWFORD
 CLIENT: U.S. DEPARTMENT OF ENERGY
 PROJECT: UNH - TANKER TRUCK PADS
 LOCATION: FERNALD, OHIO
 WBS #: 1.1.1.

COST IMPACT MATRIX

EST. NO: IH950201
 DATE: 02/06/95
 BY: KEN KEPLER
 TASK #: 3BPE1

	LIQUOR PAD		LIQUOR PAD		LIQUOR PAD		WEST DOOR PLANT 2/3 PAD		WEST DOOR PLANT 2/3 PAD		WEST DOOR PLANT 2/3 PAD	
	LABOR \$'s		S/C \$'s		MAT'L \$'s		LABOR \$'s		S/C \$'s		MAT'L \$'s	
	BASE EST:	\$33,700	BASE EST:		BASE EST:	\$11,500	BASE EST:	\$33,700	BASE EST:		BASE EST:	\$11,500
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR												
EFFICIENCY	-1%	40%					-1%	40%				
MATERIAL					-1%	25%					-1%	25%
PRICING												
CLASS OF												
CONTAMINATION												
NEW												
TECHNOLOGY												
NEW												
LAWS/REG'S												
QUANTITY												
VARIATION												
PROJECT												
DEFINITION												
(OTHER)												
TOTAL %	-1%	40%	0%	0%	-1%	25%	-1%	40%	0%	0%	-1%	25%
TOTAL \$	\$33,363	\$47,180	\$0	\$0	\$11,385	\$14,375	\$33,363	\$47,180	\$0	\$0	\$11,385	\$14,375

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

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REQUESTOR: TOM CRAWFORD
 CLIENT: U.S. DEPARTMENT OF ENERGY
 PROJECT: UNH - TANKER TRUCK PADS
 LOCATION: FERNALD, OHIO
 WBS #: 1.1.1.

COST IMPACT MATRIX

EST. NO: IH950201
 DATE: 02/06/95
 BY: KEN KEPLER
 TASK #: 3BPE1

	INDIRECT FIELD COST LABOR \$'s		INDIRECT FIELD COST S/C \$'s		INDIRECT FIELD COST MAT'L. \$'s		LABOR \$'s		S/C \$'s		MAT'L. \$'s	
	BASE EST: \$31,800		BASE EST: \$0		BASE EST: \$53,800		BASE EST: \$0		BASE EST: \$0		BASE EST: \$0	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
COST DRIVER %												
LABOR												
EFFICIENCY	-1%	30%										
MATERIAL												
PRICING					-1%	20%						
CLASS OF												
CONTAMINATION												
NEW												
TECHNOLOGY												
NEW												
LAWS/REG'S												
QUANTITY												
VARIATION												
PROJECT												
DEFINITION												
(OTHER)												
TOTAL %	-1%	30%	0%	0%	-1%	20%	0%	0%	0%	0%	0%	0%
TOTAL \$	\$31,482	\$41,340	\$0	\$0	\$53,262	\$64,560	\$0	\$0	\$0	\$0	\$0	\$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

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REQUESTOR: TOM CRAWFORD
 CLIENT: U.S. DEPARTMENT OF ENERGY
 PROJECT: UNH - TANKER TRUCK PADS
 LOCATION: FERNALD, OHIO
 WBS #: 1.1.1.

COST IMPACT MATRIX

EST. NO: IH950201
 DATE: 02/06/95
 BY: KEN KEPLER
 TASK #: 3BPE1

	CONST. MGMT. FERMCO LABOR \$'s		CONST. MGMT. FERMCO S/C \$'s		CONST. MGMT. FERMCO MAT'L. \$'s							
	BASE EST: \$55,400		BASE EST: \$0		BASE EST: \$0		BASE EST:		BASE EST: \$0		BASE EST: \$0	
COST DRIVER %	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
LABOR EFFICIENCY	-1%	30%										
MATERIAL PRICING												
CLASS OF CONTAMINATION												
NEW TECHNOLOGY												
NEW LAWS/REG'S												
QUANTITY VARIATION												
PROJECT DEFINITION (OTHER)												
TOTAL %	-1%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL \$	\$54,846	\$72,020	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

RISK PROFILE & CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

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REQUESTOR: TOM CRAWFORD
 CLIENT: U.S. DEPARTMENT OF ENERGY
 PROJECT: UNH - TANKER TRUCK PADS
 LOCATION: FERNALD, OHIO
 WBS #: 1.1.1.

COST IMPACT MATRIX

EST. NO: H950201
 DATE: 02/06/95
 BY: KEN KEPLER
 TASK #: 3BPE1

	ENGINEERING		SALES TAX									
	TOTAL \$'s		MATERIAL \$'s									
	BASE EST: \$21,300		BASE EST: \$6,000		BASE EST:		BASE EST:		BASE EST:		BASE EST:	
	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
	-1%	25%	-1%	1%								
TOTAL %	-1%	25%	-1%	1%	0%	0%	0%	0%	0%	0%	0%	0%
TOTAL \$	\$21,087	\$26,625	\$5,940	\$6,060	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

RISK PROFILE ● CORRELATION FOR EACH COST ELEMENT	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP	RISK PROFILE	CORRELATION GROUP
	U		U		U		U		U		U	

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ATTACHMENT 4

ALTERNATIVE 2 - TRUCK TRANSFER
SCHEDULE

Activity ID	Remaining duration	Early start	Early finish	Late start	Late finish	Total float	1995												1996													
							J	F	M	A	M	J	J	A	S	O	N	D	J	J	F	M	A	M	J	J	A	S	O	N	D	J
TRUCK TRANSFER																																
7UNHAL2000	0	27FEB95*		27FEB95		0	ALTERNATIVE #2 KICK-OFF																									
7UNHAL2002	20	27FEB95*	24MAR95	27FEB95	24MAR95	0	ENGINEERING DWGS & SPECS - TRUCK TRANSFER																									
7UNHAL2004	0	17MAR95*		25APR95		26	DEEP TRUCK DELIVERY(FOR UNH TRANSFER)																									
7UNHAL2006	10	20MAR95	31MAR95	20MAR95	31MAR95	0	ENGINEERING ASSESSMENT FOR SA/USQ-TRUCK XFER																									
7UNHAL2008	15	20MAR95	07APR95	20MAR95	07APR95	0	SA/UNRESOLVED SAFETY QUESTIONS-TRUCK XFER																									
7UNHAL2010	20	27MAR95	24APR95	27MAR95	24APR95	0	CONSTRUCT FOUR LOADING/UNLOADING CONCRETE PADS																									
7UNHAL2012	0		21APR95*		14JUN96	288	RECEIVE DEEP TRUCK NEW PUMP FOR UNH SLURRY																									
SAR/TSR/USQ																																
7UNH0810	9*	02FEB95A	21FEB95	02FEB95A	07APR95	33	SAFETY ANALYSIS REPORT																									
PLANT 8 DUST COLLECTOR																																
7UNH300	16*	27JAN95A	02MAR95	27JAN95A	07JUN95	67	PLANT 8 DUST COLLECTOR																									
ENGINEERING																																
60000	0	27JAN95A	01FEB95A	27JAN95A	01FEB95A		TASK 4 - WELDING INSPECTION PROCEDURE																									
H0150	37*	27JAN95A	31MAR95	27JAN95A	31MAR95	0	TASK 1 - PUMP REDESIGN & CONSTRUCTION																									
H0210	0*	28JAN95A	07FEB95A	28JAN95A	07FEB95A		TASK 6 - HEAT TRACING DESIGN & SOP																									
7UNHE80010	5	30JAN95A	14FEB95	30JAN95A	07JUN95	78	TASK 3 - TECH ASSIST;VENDOR DELIVER/MAT CONFORM																									
H0200	12*	02FEB95A	24FEB95	02FEB95A	01MAR95	3	TASK 5 - DESIGN REVISED SUPPORTS																									
H0300	31*	08FEB95	23MAR95	08MAY95	06JUN95	51	TASK 2 SECONDARY CONTAINMENT WAIVER																									
H0310	6*	25APR95	02MAY95	25APR95	02MAY95	0	ENGRG UPDATE P& IDs, PFDs, & SCHEM FOR TRAINING																									
H0189	5*	10MAY95	16MAY95	17MAY95	23MAY95	5	SYSTEM OPERABILITY TEST																									
HANGERS & SUPPORTS CONSTRUCTION																																
H0120	19*	28FEB95	24MAR95	03MAR95	30MAR95	4	CARBON STEEL PIPE HANGERS																									
H0130	19*	28FEB95	24MAR95	03MAR95	30MAR95	4	STAINLESS STEEL PIPE HANGERS																									
H0160	23*	28FEB95	30MAR95	03MAR95	31MAR95	1	PIPING SUPPORT & HEAT TRACING RECONSTRUCTION																									
WELD INSPECTION/REPAIR/HYDROTEST																																
H0110	37*	30JAN95A	31MAR95	30JAN95A	31MAR95	0	CONSTR-PUMP SKID, WELD INSPECT, HANGERS/SUPPORTS																									
H0112	17*	04FEB95A	03MAR95	04FEB95A	10MAR95	5	STAINLESS STEEL WELD INSPECTION & REPAIR																									
H0111	24	15FEB95	10MAR95	17FEB95	12MAR95	2	CARBON STEEL WELD INSPECTION & REPAIR																									
PUMP SKID J-101 CONSTRUCTION																																
H0001	34*	03FEB95A	28MAR95	03FEB95A	31MAR95	3	PUMP SKID J-101 REINSTALL & CONST ACCEPT TEST																									
PUMP SKID J-102 CONSTRUCTION																																
H0002	37*	08FEB95	31MAR95	22FEB95	31MAR95	0	PUMP SKID J-102 REINSTALL & CONST ACCEPT TEST																									

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ALTERNATIVE #2 KICK-OFF
 ENGINEERING DWGS & SPECS - TRUCK TRANSFER
 DEEP TRUCK DELIVERY(FOR UNH TRANSFER)
 ENGINEERING ASSESSMENT FOR SA/USQ-TRUCK XFER
 SA/UNRESOLVED SAFETY QUESTIONS-TRUCK XFER
 CONSTRUCT FOUR LOADING/UNLOADING CONCRETE PADS
 RECEIVE DEEP TRUCK NEW PUMP FOR UNH SLURRY

SAFETY ANALYSIS REPORT

PLANT 8 DUST COLLECTOR

TASK 4 - WELDING INSPECTION PROCEDURE

TASK 1 - PUMP REDESIGN & CONSTRUCTION

TASK 6 - HEAT TRACING DESIGN & SOP

TASK 3 - TECH ASSIST; VENDOR DELIVER/MAT CONFORM

TASK 5 - DESIGN REVISED SUPPORTS

TASK 2 SECONDARY CONTAINMENT WAIVER

ENGRG UPDATE P&IDs, PFDs, & SCHEM FOR TRAINING
 SYSTEM OPERABILITY TEST

CARBON STEEL PIPE HANGERS

STAINLESS STEEL PIPE HANGERS

PIPING SUPPORT & HEAT TRACING RECONSTRUCTION

CONSTR-PUMP SKID, WELD INSPECT, HANGERS/SUPPORTS

STAINLESS STEEL WELD INSPECTION & REPAIR

CARBON STEEL WELD INSPECTION & REPAIR

PUMP SKID J-101 REINSTALL & CONST ACCEPT TEST

PUMP SKID J-102 REINSTALL & CONST ACCEPT TEST

Project Start 20OCT94
 Project Finish 14JUN96
 Data Date 08FEB95
 Plot Date 16FEB95

ALT2

FERMCO

UNH PROJECT ALTERNATIVE # 2
 TRUCKING ALTERNATIVE SCHEDULE

Sheet 1 of 2

PREPARED BY THE WCC 15FEB95

Date	Revision	Checked	Approved

ID	duration	start	finish	start	finish	float	
PUMP SKID J-103 CONSTRUCTION							
H0003	37*	08FEB95	31MAR95	22FEB95	31MAR95	0	PUMP SKID J-103 REINSTALL & CONST ACCEPT TEST
PUMP SKID J-104 CONSTRUCTION							
H0004	37*	08FEB95	31MAR95	22FEB95	31MAR95	0	PUMP SKID J-104 REINSTALL & CONST ACCEPT TEST
PUMP SKID J-105 CONSTRUCTION							
H0005	34*	08FEB95	28MAR95	22FEB95	31MAR95	3	PUMP SKID J-105 REINSTALL & CONST ACCEPT TEST
PUMP SKID J-106 CONSTRUCTION							
H0006	37*	08FEB95	31MAR95	22FEB95	31MAR95	0	PUMP SKID J-106 REINSTALL & CONST ACCEPT TEST
UNH PROCEDURES							
H0180	16*	10APR95	02MAY95	10APR95	02MAY95	0	REVISE UNH PROCEDURES & TRUCK SOP
TRAINING							
7UNHB20040	5	22FEB95	28FEB95	11MAY95	17MAY95	55	REVISE UNH OVERVIEW LESSON PLAN
7UNHB20045	13	22FEB95	10MAR95	01MAY95	17MAY95	47	REVISE UNH TRAINING QUALIFICATION PROGRAM
7UNHB20080	11	03MAY95	17MAY95	03MAY95	17MAY95	0	REVISE OPERATOR LESSON PLAN
7UNHD20005	4	18MAY95	23MAY95	18MAY95	23MAY95	0	ADMINISTER FORMAL TRAINING TO OPERATORS
SIMULATION TRAINING							
H0100	10*	24MAY95	07JUN95	24MAY95	07JUN95	0	SIMULATION TRAINING
FERMCO OPERATIONAL READINESS REVIEW							
7UNH1015	0	08JUN95		08JUN95		0	FERMCO READY TO OPERATE
7UNH1000	26*	08JUN95	14JUL95	08JUN95	14JUL95	0	FERMCO ORR REVIEW CYCLE
7UNH1063	1	14JUL95	14JUL95	14JUL95	14JUL95	0	LETTER FROM FERMCO TO DOE - READY FOR DOE ORR
DOE ORR CYCLE							
7UNH1069	1	17JUL95	17JUL95	17JUL95	17JUL95	0	EM1 - AUTHORIZATION AT START OF DOE ORR
7UNH1070	17*	18JUL95	09AUG95	18JUL95	09AUG95	0	DOE ORR CYCLE
7UNH1180	1	09AUG95	09AUG95	09AUG95	09AUG95	0	EM-1 SIGN APPROVAL FOR UNH NEUTRALIZ START-UP
NEUTRALIZATION & FILTERING OPERATION							
DOCU80	1	10AUG95	10AUG95	10AUG95	10AUG95	0	FERMCO MANAGEMENT APPROVAL TO RSO TO PROCEED
7UNH301	0	11AUG95		11AUG95		0	COMMENCE NEUTRALIZATION OPERATION

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Project Start 20OCT94
Project Finish 14JUN96
Data Date 08FEB95
Plot Date 16FEB95

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FERMCO

UNH PROJECT ALTERNATIVE # 2

TRUCKING ALTERNATIVE SCHEDULE

Sheet 2 of 2

PREPARED BY THE WCC 15FEB95

Date	Revision	Checked	Approved